

Published on the First of
each month by
MAGAZINES, Inc.
53 West Jackson Boulevard
CHICAGO, ILL.
Established in 1880
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Patent Office
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Circulations

Entered as second class mat-
ter Oct. 17, 1917, at Post Of-
fice at Chicago, Ill., under
Act of March 3, 1879.

THE NATIONAL FRUIT MAGAZINE OF AMERICA

AMERICAN FRUIT GROWER MAGAZINE

SUBSCRIPTION RATES
One year 50c. Three years \$1.
Five years \$1.50.
Foreign \$1.00 per year

A Subscription Blank is en-
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ADVERTISING RATES
\$2.25 per agate line flat.
\$31.50 per inch per insertion.
Classified 15c word.

Volume XLIX

APRIL, 1929

Number 4

He gets a HIGHER PRICE and PROFIT

ON A RECENT TRIP through apple orchards in New England, we had the pleasure of visiting the Marshall Farm, operated and managed by George A. Marshall. We had been told that Mr. Marshall has been quite successful in the use of corrugated boxes for packing apples. We found it is the "soft" or "out-of-hand" eating varieties which are packed in corrugated boxes for the most part. Before describing his packing process, we believe you will find it interesting to know something about Mr. Marshall, his orchards and their care and management.

Mr. Marshall meets his problems a little better than half way and solves them with good judgment. He expects intelligent co-operation from his assistants but asks no more from others than he expects from himself. He is always busy and his example is reflected by those under him. His orchards, his packing houses and other buildings give the appearance of an intelligently managed and well operated business organization.

Orchard Practices

The Marshall Farm, located about two miles from Fitchburg, Mass., on the beautiful rolling hills which surround that city, contains 120 acres of bearing trees. It is a beautiful sight to see the hillsides covered with trees, each bearing its full quota of clean, healthy fruit.

A cover crop of grass holds the top-soil and the ground is cultivated three feet from the trees on all sides. Each tree is protected from gnawing rodents by a three-inch mesh galvanized wire encircling the tree 15 inches high. Trees are sprayed from eight to 12 times a year, depending on necessity.

For a dozen or more years, Mr. Marshall has used dry lime-sulphur in his spray operations and attributes his uniform success in control of apple scab and the beautiful finish of his fruit to the continuous use of this material. Scientific thinning is practiced in the Marshall orchards, giving size and color to the fruit.

Feeding the Trees

When asked for information on the kind of fertilizer used and its manner of application, Mr. Marshall replied: "We fertilize with a 5-8-7 fertilizer, about 1000 pounds per acre, spread broadcast around the trees. We would not think of not feeding our trees with some chemical fertilizer every year. We have done it ever since they were set out and they have done very well for us. It looks to

The Marshall Farm in Massachusetts Has Established a Reputation for the Beautiful Finish of Its High Quality Apples. How Mr. Marshall "Cashes In" on Sales of the Soft Varieties of Dessert Apples.

By A. R. BLACK

me as if a tree should be fed the same as anything else in order to get the very best results."

Nothing is left to chance in this orchard. It is Mr. Marshall's belief that the tree must be fed to properly produce and he backs his conviction with practice. The appearance of the trees and the fruit they bear are ample proof that fertilization has been carefully studied.

Realizing that labor and effort had been intelligently expended to produce the best results in his orchard, we told Mr. Marshall that some apple growers excuse the small size of their fruit by the statement that "God grows little apples as well as the large ones." With a tinge of disgust in his voice he remarked that "God does not prevent the orchardist from assisting nature."

At Harvest Time

Galvanized pails, with wide tops are used for picking. In the bottom of each pail a litter of grass and leaves acts as a cushion. The apples are laid, not dropped, in the pails. Transferring from pails to field boxes is done by hand. Not once did we see a picker "pour" or "dump" apples from a pail into a field box. Bruising is eliminated in the picking and handling

processes. This careful handling is not slow, as pickers soon learn to work rapidly. Competent foremen are constantly present with each group of pickers.

At the packing house the apples are graded, sorted and inspected by experienced women who very carefully grade for size, shape, color and quality. These same women pack them into the corrugated boxes.

These boxes come from the box maker folded flat and tied in bundles, with their partitions also folded flat and the partitions and dividing pads, all made of corrugated paperboard, also tied in bundles. They require very little storage room and setting them up ready for use is an operation that requires only a small amount of time.

The box is set up by opening it and folding the bottom flaps across the bottom opening. The first set, or tier, of partitions is set in the box and packing begins. The cell size in the partitions is just large enough to hold that particular size of apple. However, being made of corrugated paperboard, they are pliable and will allow a variation of one-quarter of an inch in size. The filled boxes present a very attractive appearance.

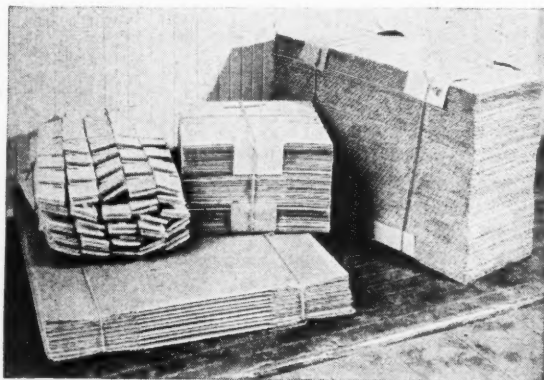
The cost of these boxes with partitions and layer pads will average a very little more than the tub style bushel baskets. The boxes used by Mr. Marshall are of extra quality and cost him somewhat more but the prices he gets for his fruit warrant the extra expenditure.

At the Marshall orchards the packing of apples begins with the picking season and continues until February first. A cold storage plant with a capacity of 5000 bushels is located on the premises. Apples not shipped when picked and packed are held in storage.

The Marshall orchards sell between 3000 and 4000 paperboard boxes of apples annually in addition to their sales in wooden boxes. The quality and the method of packing have made satisfied customers who have, by their recommendation, heavily increased that part of the trade.

Honest Grading and Proper Packing Pays

We asked Mr. Marshall whether, in his opinion, there is a market, at favorable prices, for all the Extra Fancy apples grown in the eastern half of the country if honestly graded and properly packed. He (To Page 22)



Above. Corrugated boxes, with partitions and dividing pads come folded flat and tied in compact bundles

Left. Boxes sealed and labeled for shipment

Right. Each apple is wrapped in printed oiled wrappers and packed in the corrugated boxes with stem end up, except Delicious, which are packed on their sides



"BROOKS' FRUIT SPOT" Cost \$1,000,000

A Spasmodic Epidemic Ruined the Apple Crop in the Ohio Valley Last Fall, Causing Damage of Over One Million Dollars. It Is Not Regional and May Become Epidemic Anywhere.

By H. C. YOUNG

Ohio Experiment Station

TWO WEEKS before harvest in the Ohio Valley in 1928 there were excellent indications for a bumper crop of high-grade apples. A few days before picking time, small greenish-red sunken spots began to appear on the fruit. By the time the apples were harvested, these spots had so increased in number as to give the fruit the appearance of having the small pox. Instead of having first-grade apples, the bulk of the crop went into seconds, or even culls. Inspectors estimated that a loss of well over a million dollars resulted.

The epidemic was entirely unexpected, though the disease has caused spasmodic losses in the Ohio Valley for more than 15 years. It is caused by a fungus, *Micospaecella pomi*, which was first studied in New Hampshire by Brooks in 1912. Since that time, it has caused rather severe losses throughout the New England states and occasionally elsewhere.

The disease became prevalent enough in Ohio about 1920 to warrant investigations. The results of experiments conducted in 1921 and 1922 were published in the Ohio Agricultural Experiment Station Monthly Bulletin, Volume VIII, May-June, 1923. Until this time, in fact, up until last year, the disease caused very little loss except in very few orchards.

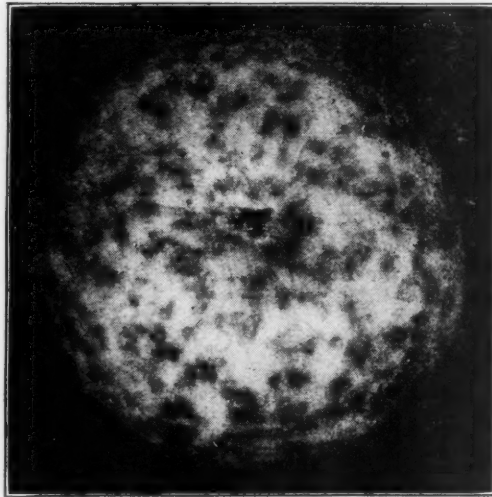
During this period attempts were made to experiment with it but results were difficult to obtain because of the spasmodic action of the fungus. Many experiments yielded absolutely no results, and since no large losses were ever encountered, it was thought that the disease was just one of the many of its kind which appears here and there but is never of much consequence.

Even after the epidemic of last year it is doubtful whether another such recurrence will be experienced very soon. However, the disease must now be considered of major importance and must receive thorough study. Neither can it be said to be regional, and it may become epidemic most anywhere.

Description of the Disease

The disease appears on the apple as small spots, usually centering at the fruit lentils. Since there are more lentils at the blossom end of the fruit, most of the spots will be found in that region. Frequently, this fact is used in distinguishing the disease from the ordinary breakdown physiological fruit spots.

When young, the spots are only a little darker than the normal color of the skin of the fruit. They will appear dark greenish-red on the more colored portion and somewhat lighter on the greenish portion of the apples. The spots first appear in August, rarely earlier, and as they grow they turn dark brown or black and become somewhat sunken. At first, the spots are superficial but later the tissue under them becomes brown and corky, but this extends for only a small fraction of an inch into the pulp. Black specks appear upon the sur-



Typical appearance of Brooks' Fruit Spot

face of the spots. A severely spotted apple is shown in the accompanying illustration.

The Fungus

There is, in reality, very little known about the nature and action of the fungus, that is, insofar as points of attack for control are concerned. Most of the work has been a study of the life history, and even this phase is far from complete. Before control measures can be effectively used, a fairly complete knowledge of the disease-causing organism should be at hand. Let us review what is known.

In all probability the fungus lives over winter on old decaying leaves, much as scab does. There have been reports that it produces twig cankers and lives over in these, but so far we have been unable to confirm this.

In the spring it produces what is called the perfect or fruiting stage, in which the first spores are formed. These are usually ripe shortly after the petal fall period of the apple, the exact time depending upon the weather.

The organism in its development seems to be very sensitive to moisture and when that is available, the spores ripen, are discharged and infect.

An extensive series of experiments was conducted in Pennsylvania by the late Prof. Walton, and the results showed that it took two to three months for the fruit spot to show up after the initial infection. In the case of apple scab, this incubation period is 12 to 14 days.

Assuming that this length of time is required in the Ohio Valley, the time of infection last year was some time during June. However, we cannot exactly assume this. Experiments conducted in the laboratory this winter show that the fungus is very sensitive to both moisture and temperature. It has been found that the fungus is a relatively cool weather organism. It is actually

killed by a temperature of 100 degrees Fahrenheit, and scarcely grows at all from 85 to 100 degrees Fahrenheit.

Our tests also show that an apple must have a high water content before it can be infected with fruit spot. Many workers have attempted to infect apples after July but were unsuccessful. Likewise, all attempts to infect apples in storage have failed. It is true that the disease often shows up first in storage, but the infection did not take place then. Last fall, several barrels of apples were placed in common and cold storage, and in no case did the disease increase.

It is indeed very unlikely that the disease has a secondary infection period or produces spores on one fruit and transfers to another. This delayed appearance of the disease simply means that the growth of the fungus was slowed up by high temperature or low moisture content and did not develop until the fruit was placed in storage.

The results given above were obtained but very recently and from scattered sources. Possibly they do not include the whole story. It is known that many fungi that cause disease, produce more than one type of spore, and this seems very likely with Brooks' Spot.

Up until a few years ago it was thought that the fungus reproduced itself only by what are called conidia. These were thought to be produced in large numbers during the spring and summer on old leaves and other trash which may be in the orchard. It might be that at times spores are produced in considerable numbers on dead twigs, bed scabs, etc., where they would be readily spattered to fruit during rainy periods.

While no one has ever seen these spores in these places, they might well be there, as they would be difficult to find. There is still a third type of spore which is produced in small black fruiting bodies which sometimes are found in the older fruit spots. All of this may complicate control procedures.

Control Measures

One thing we are relatively sure of and that is that infection takes place by the middle (To Page 25)

Some Facts about Bordeaux Mixtures

An Interesting Explanation of the Action of Copper Fungicides, Pointing Out a Possible Reason Why Home Mixed Bordeaux Mixtures are Variable in Residual Effectiveness.

By C. F. G. CARPENTER

THE DAY HAS COME when it is necessary for the progressive grower to know something of the chemical nature of the spray materials he uses. The mere fact that the material will kill either insects or fungi is not sufficient reason for its use or purchase. What are the effects of certain chemicals on plants? Why does one get burning of foliage or russetting of apples? It is not necessarily on account of having put the material on too strongly, and neither need it be on account of weather conditions. More often it is due to the admixture of chemicals, with their inevitable chemical reaction. A successful grower in these days must know *why* everything is done in his orchard, and the exact relationship between each thing.

Much Research Work Necessary

As in spraying or dusting, so it is in fertilizing—much research must be done before the grower can hope to get the maximum results with the minimum of expense. It is not for the grower to do the experimental work, that is the role of the United States Department of Agriculture, the state experiment stations, and the commercial companies. There is much criticism of all three. The former two are perhaps too generally conservative in their recommendations until a material or plan has been thoroughly and extensively investigated, and the latter, except in the case of reputable and old-established houses, have at times laid themselves open to the suspicion of not giving their products sufficient preliminary trial before placing them on the market. Naturally, it is the commercial com-

panies that take the lead in developing new materials, and it is to them that much of the credit should go for the splendid manner in which they have helped the fruit grower.

Then, too, the progressive agricultural magazines have done their share in disseminating the results of experiments and in giving publicity to new products as they are developed. It is, perhaps, unfortunate that there is an unwritten law that the new materials are not mentioned by brand in any magazine articles, as to do so would be to give direct advertising to the manufacturer concerned.

Most growers know that they should not buy on price alone, no matter how attractive that may appear, as quality and reputation certainly bring safer and surer results.

Solubility of Copper in Bordeaux

Bordeaux mixture to many users is just Bordeaux mixture, having either a good or an indifferent color, the color apparently being used in a number of cases as a basis of standard. The activity of Bordeaux mix-

ture is due primarily to its copper content and the degree of solubility of the copper precipitants.

With the mixing of bluestone and lime, chemical action or actions take place, and a precipitate is formed which may or may not possess value as a fungicide. The copper must be soluble to a point where it is favorable to the destruction of the fungi without injury to the plant.

Both fungi (which are plants without chlorophyll or green coloring matter) and the higher plants possess protein, and it is probably due to the attraction existing between these proteins and the copper composition that a combination is formed (where the copper is sufficiently soluble) which, if of the correct strength, will destroy or alter the physiological characteristics only of the proteins in the fungi without in any way affecting the proteins in the host plant. By "host plant" is meant the actual plants upon which the fungi are parasitic. For example, apple foliage and fruit are the "host" of the scab fungus.

It will be seen that the degree of solubility of the copper is very important for the successful application of Bordeaux mixture as a fungicide. Too great a degree of solubility will cause a burning or russetting of the fruit and foliage. In the case of apples, some varieties will exhibit this spray injury more readily than others.

There is no difference in the relation of the copper and lime in a 4-4-50 and in a 5-5-50 mixture. In fact, the same results could be achieved with the one as with the other if a longer period of spraying were given

with the former, as the solubility of the copper would be identical in both cases.

The essential characteristics of plants should be known before using Bordeaux mixture. In some instances a slower acting Bordeaux (one in which the copper is more slowly soluble) would be preferable owing to the natural reaction of the plant. Bitter rot, for instance, requires a stronger Bordeaux (one in which the copper is more readily soluble) than does scab. It will, therefore, be seen that the fungicidal value of Bordeaux does not depend so much upon its copper content as upon the solubility of the copper.

With home-made Bordeaux mixture, the initial action is due to a mixture of copper salts together with carbo-

nate of lime, and this mixture will cover the plant sprayed so that there is a large physical protection, but with a minor chemical protection. There is a decrease in adherence or coverage with the growth of the foliage.

Chemical Changes in Bordeaux

Where a large amount of lime is used in the manufacture of home-made Bordeaux, the copper precipitates over the particles of lime, and a mixture of copper hydrate with certain cuperous salts is formed, and a certain amount of copper salts are enclosed in the resultant membranous precipitate. After the solution stands, the enclosed particles of lime in contact with the liquid neutralize and the Bordeaux changes chemi-

cally, and the copper becomes more and more insoluble. With any excess of lime the copper will unite with the lime, and a calcium cuperate results.

The ideal Bordeaux mixture is a dust form which will float or penetrate through the foliage with a resultant even coverage of all the foliage when it would be impossible for any spores of fungi to develop, that is providing that the copper content of such a Bordeaux has a sufficient degree of solubility to make it active and safe. Spraying will only cover a certain proportion of the leaves, whereas a dust cloud will permeate through the densest foliage, particularly if the particles of the dust are very fine, and a more or less equal distribution of the Bordeaux is ensured.

How NEW CHERRIES are Produced

So Much Has Been Written About Improved Varieties of Other Tree Fruits That the Cherry Appears to Have Been Neglected. That This Is Not the Case Is Explained in This Article.

By D. F. JONES

Connecticut Experiment Station

TIME is the great modernizer of all.

While some men are spending sleepless nights and dizzy days bettering the powers of locomotion for air, land and sea to give this generation the best that is to be had, other men are busy bringing the fruits of nature up-to-date. The great aim of humanity is to obtain perfection and to obtain it at the earliest possible time. Even nature doesn't have a chance to be old-fashioned, for not a peach or a plum variety that was popular 70 years ago is now planted. At that time the Concord grape, the Delicious and McIntosh apples were unknown, and many varieties ranked ahead of Baldwin in popularity. Black Tartarian and Early Richmond were the leading cherries, Montmorency being scarcely known as a sour cherry. The strawberry catalogs of even 15 years ago contain very few names that now make up the lists of leading varieties. Varieties of fruit have changed in the past and are changing now. It is inevitable that 50 years from now not an important variety of today will be first in numbers planted.

Some New Cherries Developed

Of all the more valuable tree fruits, the number of varieties of cherries has been more restricted than of any other kinds. Three varieties of sour cherries and scarcely more of sweet varieties can be found in the leading nursery catalogs. Within recent years, several promising new sweet and sour cherries have been developed, and attention has also been called to some of the older varieties that are worthy of more general cultivation.

The Seneca is a new variety of sweet cherry originated by the New York Experiment Station at Geneva. It is remarkably early, ripening two weeks ahead of Black Tartarian, the standard early cherry in New York. The qualities of the tree and fruit are excellent. This variety

grew from a cross-pollinated seed of Early Purple Guigne and an unknown early sweet cherry. It has been carefully tested and should be tried wherever sweet cherries can be raised.

Cherry growers in the central states will be happy to learn that a sour cherry of the Morello type is now available that is as hardy and productive as that well known and widely planted variety. The fruits are larger and milder in flavor and more agreeable as fresh fruit. The trees are larger, healthier and more spreading than English Morello. These are the chief characters of the Chase cherry as it grows in New York. Its history is obscure, being first heard of in Riga, N. Y., about 1890. It was first named Riga, but on account of there being an older variety by that name widely grown in the Middle West, it was renamed Chase. A more complete description of this variety is given in the Geneva, N. Y., Bulletin 497, one of a series of publications on "New and Noteworthy Fruits" that should be of interest to every fruit grower.

The Duke Cherries

The Duke cherries have long been grown but are not generally planted. They combine many of the good features of both sweet and sour sorts. One variety, the Abbesse d'Oignies, has been introduced from Russia by Prof. Budd of Iowa and is one of the few cherries of this class that succeeds in the Mississippi Valley. The quality is excellent. Possibly on account of its unpronounceable name it is not listed in nursery catalogs and is not as generally grown as it should be.

Reine Hortense is another Duke cherry of fine quality that is admirably suited to the home fruit collection. The trees are small and very attractive when in leaf, in flower and in fruit and might well take the place of many low-growing trees or larger bushes in the

ornamental plantings. This is an old French variety, introduced and widely grown in America in the middle of the nineteenth century when high quality cherries were more appreciated than they are at present. This variety is possibly too tender for the central states, and the fruit is too soft for distant shipment, but it is well recommended for the garden in the eastern states.

The varieties of cherries usually recommended, such as Wood, Windsor and Napoleon of the sweets, and Richmond, Montmorency and Morello of the sour sorts, are excellent varieties but are listed by nurserymen largely because they succeed over a wide range of soil and seasonal conditions. In almost every section of the country there are varieties that are better in some respects, and for the home orchard especially. Quality

While it is too soon to estimate the value of the cherries originated by Burbank, in comparison with the other workers in this field, his achievements are noteworthy but not outstanding. As to methods, he has contributed nothing new. For his first seedlings he used Early Purple Guigne and Black Tartarian sweet cherries principally. Later, material was gathered from Russia, and Japan, as well as from different sections of this country.

The cherry flower is one of the easiest to emasculate and pollinate. The stamens are so placed on the corolla that a cut with a small, sharp knife around the bud just above the receptacle removes all the anthers in one operation. The emasculated flowers should be enclosed in a paper sack to protect them from drying and to exclude undesired pollen. About two days later when the flowers in the same stage of development are open, pollen should be applied to the stigmas. To collect pollen in quantity, the easiest way is to gather flowers just before they have opened, remove the anthers and spread them out on a piece of paper in a dry, warm room. In a day or two the anthers will have burst and the pollen can be collected in a small bottle. By shaking the bottle, enough pollen will adhere to the cork to pollinate several flowers. This is done by touching the pollen-covered surface of the cork to the sticky tip of the stigma.

Only one seed is formed by each flower, so the production of cross-pollinated seed in quantity is rather tedious. Burbank left most of his pollination to be done by bees.

There is no more fascinating pastime nor one more likely to benefit others than the production of new and better varieties of fruit. The cherry is one of the easiest of orchard fruits to work with and from the standpoint of hardness of tree, size and quality of fruit there is much yet to be done. Some day good varieties of sweet firm-

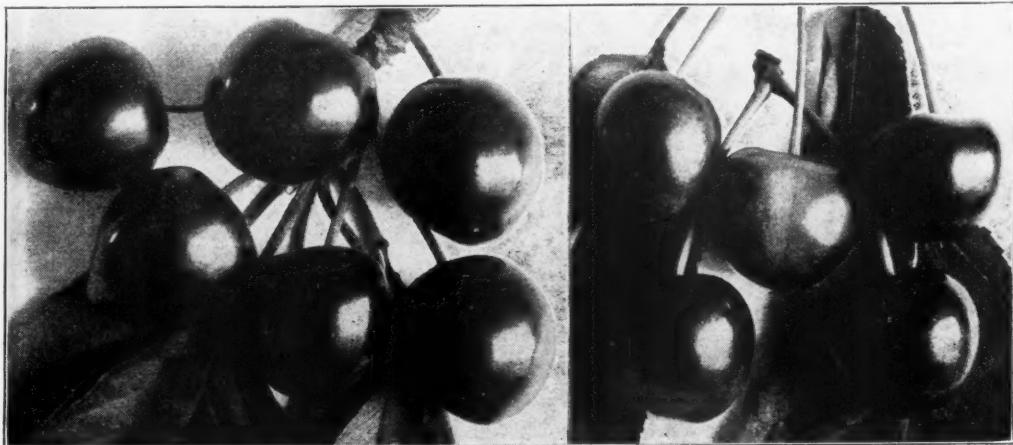
fleshed cherries will be growing all over the central states where now only the Morello, Montmorency and Richmond are known.

Derris-Root Poison Is Speedy and Safe

ONE OF THE deadliest poisons known to chemistry is also considered one of the safest for use as a spray on fruits and vegetables for the control of certain insects. This poison is the active principle of derris root. Its principal advantage for use as an insecticide is its chemical instability. According to Japanese scientists, about two days after it has been applied to the plant or fruit it disintegrates and ceases to be poisonous.

The poisonous properties may be preserved in the root, or, after extraction, in an oil solution. Chemists believe that the oil solution mixed with soap and water to make an emulsion should prove an effective spray. The lead arsenate sprays now used in some orchard districts have forced the installation of machinery for washing the poison from the fruit before marketing. Derris-root poison would not have this disadvantage.

In the United States Department of Agriculture this poison is now under investigation by Dr. F. B. La Forge, of the Bureau of Chemistry and Soils. The active principle of derris is described as a white crystalline material insoluble in water, but soluble in ether, alcohol, oils, and other organic solvents. Dr. R. C. Roark, of the same bureau, says too little is known of its constitution as yet to predict its synthesis, although this may be possible. Investigations are continuing, and if a synthetic product can be produced at a moderate cost, the need for a safe insect poison without the disadvantageous properties of arsenic will make it highly valuable.



Left. Giant Cherry, probably the largest cherry so far produced. Geneva Station says: "The tree is large, vigorous and very productive. The cherries are attractive in size and color, and about the latest of all cherries to ripen, coming just after Lambert. The quality is splendid and the fruit does not crack." Right. The Burbank, one of the earliest of the sweets and a profitable commercial variety for that reason

should not be sacrificed for productiveness. Of poor fruit it is possible to have too much.

Some Burbank Creations

The late California plant breeder, Luther Burbank, gave much attention to cherries, and three promising varieties of sweet cherries were distributed by him within recent years: Abundance, Giant and Burbank. The first two have been grown by the New York Experiment Station and their behavior under eastern conditions is given in their bulletin series on "New and Noteworthy Fruits." As grown in New York, Abundance is described as a "splendid late cherry of the Napoleon type. One of the best of Burbank's new fruits." As to Giant, "the quality is splendid and the cherries do not crack."

The Burbank variety is an early-ripening cherry of good size, characters which are highly appreciated in this fruit. Burbank realized the commercial importance of an early-ripening cherry suitable for shipping, and should this variety prove to meet this need, it will have very great value for cherry-growing sections. Only one of the leading California nursery companies lists the Burbank cherry and this is the only variety of that origin given. Their description of this variety is "a highly flavored cherry somewhat larger than Black Tartarian and 10 days earlier; not a very heavy bearer."

WATER INJURY to CITRUS TREES

MANY of the citrus groves in Florida, particularly along the lower east and west coasts, have been planted on land that is inadequately drained, at least for the excessively rainy periods. This problem is in some cases further complicated by underlying formations of hardpan, marl or rock and by droughty periods following unusually wet ones.

Hundreds of citrus trees are removed annually in Florida on account of dead or rotted roots resulting from water injury, and hundreds of acres remain less productive as a result of various types of water injury.

Types of Water Injury

Water injury may be classed under two general types: the chronic type and the occasional or periodic type. The chronic type is the injury to trees in decidedly low and poorly drained situations. The occasional, or periodic, type is the injury to trees that have made a normal growth for a number of years and then have the root systems injured by abrupt rises of the water table during seasons of unusually heavy rainfall. Combinations and gradations exist between these types.

Chronic Type of Water Injury

Chronic water injury may be recognized by the pallid appearance and small size of the foliage as compared with the deep green color and normal size of the foliage of trees on higher or better drained land. After a few years of chronic water injury, the affected trees are found to be stunted.

Instances can often be seen in groves where trees in the low situations gradually decrease in height and size of top and become more yellow and less productive progressively from the well-drained portions to the poorest-drained portions.

In severe cases of water injury (Figure 1), the trees present a striking contrast with those in well-drained portions of the same grove (Figure 2). The few roots remaining to trees that have had their root systems repeatedly killed back by water injury remain confined near the surface and are readily injured by extremes in soil moisture conditions.

Where ditching or pumping out the water is resorted to in order to improve the drainage conditions, the trees may recover if they have not been injured too severely before these corrective measures are undertaken. Where no measures are taken to improve drainage, injured trees may become so weakened that the tops die back and very little new growth is developed.

Occasional or Periodic Type of Water Injury

In the occasional, or periodic, type of water injury the effect upon the trees varies according to the age of the trees, kinds of rootstock, nature of the soil, subsequent soil moisture conditions, and severity of the injury. With trees that have previously made a good development, prolonged saturation of the soil may result in their sudden death. Trees less severely injured may drop their foliage, leaving most of the fruit hanging (Figure 3).

Many normally growing trees that are suddenly injured even moderately develop a marked wilting and curling of the foliage a month or longer after the injury. Trees exhibiting this delayed effect of water injury may occur on fairly level land about the margins of low areas. With the subsequent drying out of the soil, a wilting of the foliage may develop and defoliation may occur (Figure 4).

Trees that have been making a good growth for a number of years and then have the root systems injured moderately may recover. However, if another wet spell follows or a prolonged drought occurs within a few months, the previous injury to the root system is intensified. Trees thus doubly injured quickly develop a chronic wilting, lose a large part of their foliage and die back rapidly. Repeated injury of trees by excessive water, especially when the injury becomes intensified by the subsequent occurrence of drought, may result in the wiping out of grove areas of considerable size (Figure 5).

Cause of Water Injury

Most plants must have a supply of air in the soil. In respiration the roots, as well as other parts of the

A General Discussion of the Causes of Water Injury to Citrus Trees that Results in the Death of Hundreds of Trees, and Renders Unprofitable Many Acres of Florida Citrus Groves, with Some Preventive and Remedial Measures.

By **ARTHUR S. RHOADS**

Florida Experiment Station

plant, take in oxygen and give off carbon dioxide. The carbon dioxide from the air in the soil unites with water, forming carbonic acid, which assists in the solution of mineral matter not soluble in water alone. The delicate feeding rootlets must absorb through their cell walls the plant food that has gone into solution. A soil will not permit good root growth when the air supply is driven out by water, and the roots of citrus trees cease to function and actually die in consequence of water logging. Many parasitic organisms require less oxygen than the roots they attack and can grow

be killed off by a sudden rise in the water table. New roots may subsequently develop if the root systems have not been injured so severely that the trees die outright (Figure 7).

Preventive and Remedial Measures

Drainage is of fundamental importance to the citrus grower. Where it does not exist naturally, it must be supplied artificially. Trees should not be planted on land that is inadequately drained or too closely underlain by any impervious layer. Many Florida soils are rather low-lying and often difficult to drain by reason of the lack of slope to the land. Rainfall fluctuates widely from season to season and from year to year. Heavy periods of rainfall often occur in late summer and fall, whereas during the winter and spring months there is commonly a decided shortage of rainfall.

Before planting a piece of low-lying land to grove, allowance should be made for extremes of rainfall which are sure to occur. Many grove sites suffer from fluctuations of the water table, and those that may be too dry during the dry season may become excessively wet during prolonged rainy periods. The possibilities of adequately draining a piece of land for a grove should be judged from an inspection during the rainy season.

In preparing a grove site for planting where drainage is necessary, an adequate system of ditches should be cut. These should be of sufficient depth to take care of unusually wet seasons. A competent engineer or surveyor should run the proper levels.

Where it is necessary on poorly drained land to plant the trees on ridges, the middles should be as deep as practicable and the beds as high and broad as they can be made, so that the trees will at all times have plenty of well-developed roots above the maximum level of the water-soaked soil.

Many growers make the mistake of planting their grove first and then finding themselves in the position of having to provide adequate drainage afterwards. Or, perhaps the drainage system provided suffices only for the first four or five years, or until the roots have penetrated to, or nearly to, the depth of the ditches. The inadequacy of the drainage system may become apparent first by the occurrence of one of the inevitably excessively wet seasons, which will result in yellowing, wilting and loss of foliage, dropping of fruit, dying of branches, etc., caused by soured and dead roots.

Groves already established on inadequately drained land and suffering from water injury, should have the drainage system improved by cleaning out or deepening the already existing ditches, cutting additional ones, installation of a system of tile drains, or by combinations of these measures.

Groves so situated that there is not sufficient rapidity of run-off from the ditches to take care of the surplus water should have installed a good pump of sufficient capacity to lower the water in the ditches to a suitable level within a 24-hour period. Trees that have been planted too deeply should be raised until the crown roots are level with the top of the ground.

Trees that have been but moderately injured to the extent of partial defoliation and the dying back of some of the branches, should be headed back well, in which case it is advisable to whitewash the trunks and stubs of the limbs to prevent scalding. Trees cut back in this way should be given the fertilizer as applied to young trees for stimulating growth and wood production. The shoots should be thinned as they develop. Recovery of such trees will depend largely upon the subsequent soil moisture conditions and method of handling of the tree. It will not pay to spend time in treating trees that are badly injured by water to the extent that they have no great amount of roots remaining alive.

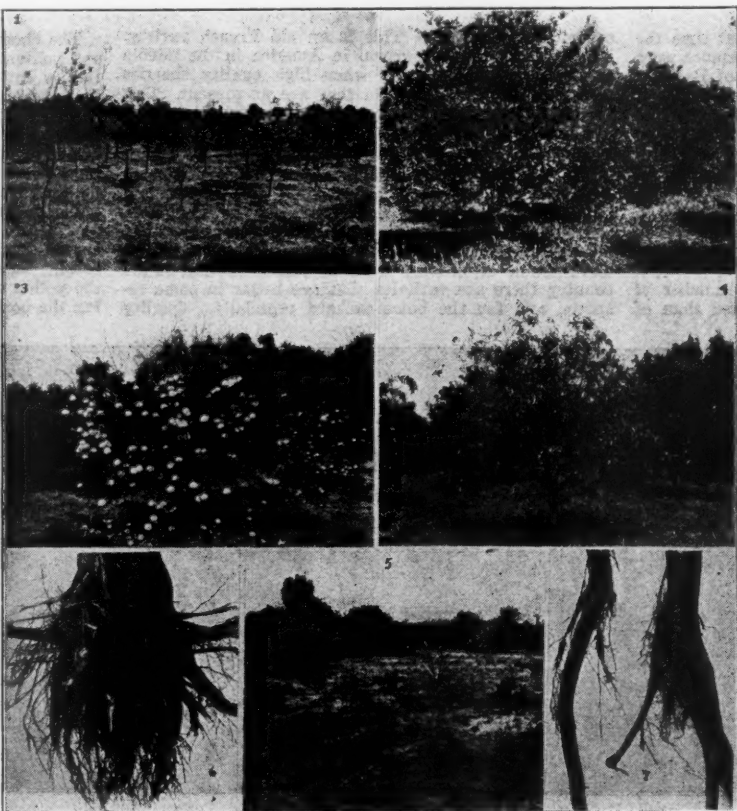


Fig. 1. Portion of 12-year-old Lue Gim Gong orange grove that has become stunted, unproductive and half dead as a result of chronic water injury. Compare with normal growth of trees of the same age shown in Fig. 2.

Fig. 2. Well-drained portion of the same grove shown in Fig. 1. These trees have made a normal growth and development and are highly productive.

Fig. 3. Two 12-year-old grapefruit trees that were making a good development in a low situation in a grove until an unusually wet spell caused the soil to remain saturated sufficiently long to defoliate and kill the trees.

Fig. 4. Pronounced wilting and curling of the foliage of a Lue Gim Gong orange tree moderately injured by excessive water during the fall. This tree has lost much of its foliage and, in contrast to the uninjured trees, failed to develop bloom and the flush of new growth the following spring, thus behaving like a so-called "blighted" tree.

Fig. 5. Large area of a 12-year-old mixed grove, in which the trees shown in Fig. 3 occurred, wiped out as a result of repeated water injury. A few half dead trees shown in the rear of this area, adjoining the block of older trees shown in the background, should also have been removed.

Fig. 6. Taproot developed by a 12-year-old Lue Gim Gong orange tree on sour orange rootstock in marly subsoil in which the water table is permanently high. Note the stunted development and repeated branching of this taproot resulting from the limitations imposed upon its growth; also the repeated killing back of the root divisions by sudden rises of the water table.

Fig. 7. Large sour orange roots killed back for several feet as a result of a sudden and prolonged rise of the water table. Note the new fibrous roots developed from the callus formed at the margin of the living part, many of them growing under the old rotted bark and sloughing it off.

well in soils so wet as to cause injury to the roots.

Good aeration of the soil is also essential for the proper functioning of soil micro-organisms whose function it is to digest the ingredients necessary to plant growth. For example, the nitrifying group of bacteria change ammonia into nitrites and these into nitrates. Another group have the power to work with legumes in changing the nitrogen of the air into nitrates. Other groups transform humus into simpler products that can be utilized by plants. Just how long these useful bacteria can exist in saturated soils has not been ascertained, but they are known to live in running water for a much longer time than in stagnant water.

Codling Moth Control in the Pacific Northwest

By R. L. WEBSTER

Washington State College

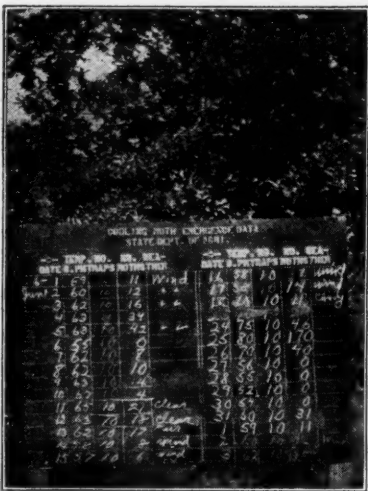
DURING 1928 the Washington Experiment Station made trials of various insecticides to try to find some means of reducing the amount of lead arsenate applied during the season, and also to attempt to determine the practical value of banding, scraping of trees, use of traps, etc.

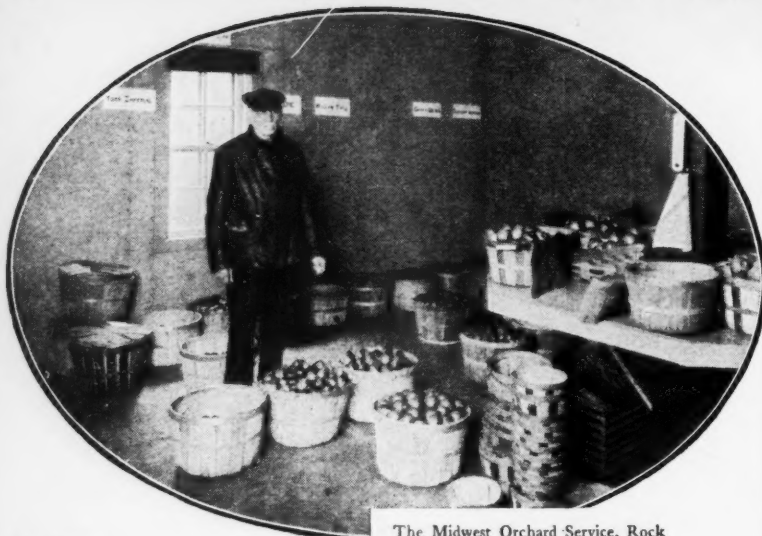
Approximately 750,000 apples were carefully examined for worm holes and "stings." The Wenatchee experiments were under the supervision of Anthony Spuler, who this fall finished his third year of work on the codling moth in that region, which ships out some 18,000 to 20,000 carloads of apples a year.

Probably no other apple region obtains a higher degree of codling moth control than the Pacific Northwest. Certainly no district is better equipped with spraying outfits, stationary and portable. This has led to the use of more and more lead arsenate from year to year, which in turn has led to the arsenical residue situation. Believing that the less the amount of lead arsenate that is applied to foliage and fruits during the growing season, the less would be the difficulty in its removal, special efforts were made during the past season to reduce the quantity of lead arsenate applied and still obtain adequate control.

Fish Oil as an Adhesive

Previous work had shown that the addition of a semi-drying oil, such as fish oil, would increase the efficiency of such arsenicals as calcium arsenate and mag-





The Midwest Orchard Service, Rock Island, Illinois, handles an average of 18,000 bushels of apples and potatoes a year. Here is the display room and some of the apples protected by Celotex insulation.

"Celotex keeps produce from freezing"

G. L. Smith, Manager Midwest Orchard Service, Rock Island, Illinois, says use of Celotex in warehouse has resulted in nearly perfect control of temperature

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A Successful Air Cooled Fruit Storage

By CLARENCE E. BAKER

Purdue University Agricultural Experiment Station

HAVING given consideration in previous issues of AMERICAN FRUIT GROWER MAGAZINE to the factors involved in air-cooled storage construction and management, let us go to some commercial orchards where air-cooled storages built and managed as outlined in the previous discussions are in successful operation and examine the buildings in detail. Many such storages could be in-

1. The north side of the basement was open and the interior was used as a miscellaneous storage. The floor above is used as a mess hall and sleeping quarters for the extra help required during the harvest season, and on the second floor is a cooperage and barrel storage.

A covered driveway was built along the north side of the building, as shown in Figure 2. The walls of this structure are

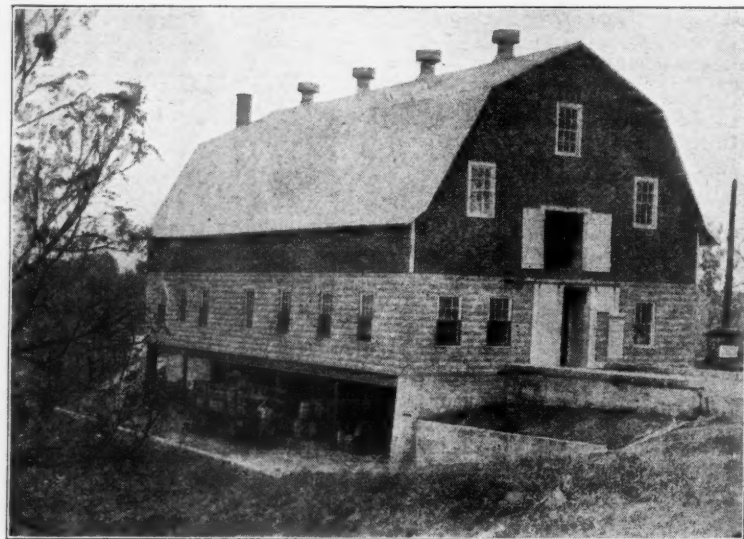


Fig. 1. The building before converting basement into an air-cooled storage

cluded, but for the sake of brevity, let us take for this month a good example of a large storage. Smaller storages will be taken up in succeeding issues. In reading the descriptions of these buildings, it should be remembered that the size can be modified to suit conditions once the principle of construction and operation is understood.

The construction work involved in the

of concrete 12 inches thick. The space between the roof joists is filled with ground cork, which was secured at a reasonable price from a nearby refrigerator plant where it was a waste product. Celotex is used on the bottom of the roof joists to form the ceiling of the driveway shed. At either end of the covered driveway are large double doors, and on the north side are four doors, each four by



Fig. 2. The covered driveway built along the open side of the basement

storage described was done very largely by the orchardist himself with his regular farm labor or with some help from an experienced carpenter.

Basement Converted Into Storage

The basement of a large building was converted into a very efficient air-cooled storage by the operators of an extensive commercial apple orchard in southeastern Indiana. Before the storage was built, the building appeared as shown in Figure

six and one-half feet, all of which are opened when the building is being ventilated.

The storage proper is built beneath the building and is 38 by 72 feet with eight feet of headroom above the false floor, giving a capacity of about 9000 bushels stored in crates. A six-inch concrete wall separates the south side of the driveway from the storage room. This wall contains four doors similar to those (To Page 23)

Blackberries Stopped Erosion--and Brought a Small Profit

By E. N. TREAT

ALL PARTS of a farm should produce a profit. Even a side hill on my farm has been made to produce a financial gain where formerly it was with much difficulty that grass could be made to grow. This side hill gullied badly during every rain storm. Various means had been employed to check this condition, but the results were always a wearing away of the soil and an increasing number of small stones, until I thought to check the gully and eventually make that land produce a gain by establishing a root system that would be difficult to wash down the rather steep hillside.

Late in the fall I applied a heavy coating of barnyard manure, which was plowed under as soon as it was spread. It was left in the rough that winter and plowed again the following spring. This second plowing was somewhat deeper than usual and in the direction of the circumference of the hill. A furrow was plowed every 12 feet down the hill, which left rows that distance apart. One hundred pounds of 8-2-5 commercial fertilizer were then sown into each 200 feet of row and this was then mixed by running the plow through that furrow at a depth sufficient to somewhat mix the soil and fertilizer.

Red and black raspberry roots, blackberry and wine berry settings were secured from a reliable nursery and set in the bottom of the furrows. Sufficient earth was drawn over the roots to permit the crown to make rapid growth, for it was but March 15 at that time and the soil was still wet and cold. I alternated rows of varieties, but placed the wine berry roots where the gully had been greatest. I set each root two feet apart, except in the gullies, where I planted them as closely together as possible.

Their growth was rapid during the first summer, and to give strength to the canes, I pinched off all blossoms as soon as they appeared. The spaces between the rows were planted and frequent hoeings were made about the canes. When fall arrived I had several likely looking rows of berry canes, and a heavy matted root system

Picking cultivated blackberries is much less tiresome than gathering the low growing varieties, for one may stand at his work. I suspended a market basket from my shoulders by means of a light belt, and by placing four quart boxes in the basket I could use both hands to pick. When the boxes were filled they were removed and other boxes replaced. This method eliminated unnecessary handling, the berries being handled only once.

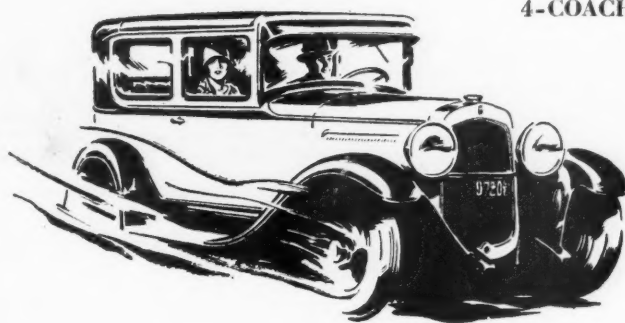
Though my crop was greater than I had anticipated, I found the demand much greater than my supply. The result was that orders were received ahead of each picking and the berries sold direct from the field. The quality was unusually good.

When the berry season was past I had realized a profit of \$60. This sum did not include the profits from crops grown between the berry rows. The total financial

gain from this sloping section was far greater than had ever before been realized, and, as I have said, this was made possible by planting berry roots circumferentially on the hillside.

Though it is several years since these canes were set, there is an annual return from that section where nothing had grown before. I find it most profitable to give my berry canes much attention during the early fall by applying a mulch about the canes. Old canes are removed immediately after fruiting and burned.

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Cane fruits prove valuable in stopping erosion on side hill

had grown which, with the exception of one or two places, had checked the downward rush of rain water.

To keep the rows straight, I set posts 15 feet apart in the rows, and to these posts I attached a wire of sufficient strength to bear the weight of the canes between the posts. The canes were then thinned and those remaining were loosely attached to the supporting wire by light gauge copper wires which would not rust during the wet season.

The following spring I applied a heavy coating of barnyard manure. The sections between the berry rows were plowed and at one place I set my new strawberry bed, and the other spaces were used for trucking vegetables.

My first blackberry crop was much greater than I had expected. The berries were much larger than the wild varieties, though upon a few canes there were many small berries which were unfit for market. These canes or roots were found to be infected with anthracnose, so were removed and burned at once, and disease-free roots set in their places.

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Pruning Fruit Trees at Planting Time

By T. J. TALBERT
University of Missouri

PRUNING the newly set tree is primarily for the purpose of reducing the evaporating surface of the tree until new root growth becomes established to supply adequate water. Incidentally, also, it may serve in starting a proper framework, or branching system. The degree of pruning which is desirable differs with the species. Trees like the peach, which start new branches readily from the central trunk, but the twigs of which tend to dry out badly, should be cut back most severely. Trees like the sour cherry, which do not start growth readily from the dormant buds on the older parts, but which make new growth from the active buds near the terminals of branches, should be pruned least.

Pear and Apple—The pear and apple should be cut back to a medium degree. The side branches should be cut back so as to reduce them one-half to three-fourths. The central stem should be shortened, but left from 10 to 16 inches higher than any of the surrounding branches. At the end of the first season's growth, the permanent framework may be established by removing all but from three to five well distributed, outward spreading limbs to secure a modified leader tree. If the tree is large so permanent limbs may be chosen at the time of transplanting, this permanent framework may be established then. If the tree is a one-year-old whip having no branches, it should be shortened to a height of about two and one-half or three feet, with the view to securing a good branching system below the point of cutting back.

Peach, Nectarine and Japanese Plum—The peach should generally be pruned to a single stem by removing the side branches and shortening the main trunk to two or three feet in height. The nectarine and Japanese plum should be pruned in a similar way, except that the latter may retain stubs, a few inches long, of three to five main limbs if the branches are large and well established. These species start new growth most readily from the main trunk or the base of the limbs.

American Plum—The American plum should be cut back somewhat less severely than the apple. If the tree is well branched, three or four main limbs may be left intact to form a permanent head and the remaining stem and branches removed. The side branches remaining may be shortened one-third to one-half.

Sour Cherry—The sour cherry should not have its permanent branches cut back, as it starts new growth most readily from the larger, active buds at the terminals. Three to five main limbs should be chosen for the permanent framework and the remaining limbs should be removed. The limbs which remain should have their terminals left intact. Instead of cutting back twigs, they are merely thinned out to four or five well placed branches arranged up and down and around the main stem at distances of four to eight inches. Under Missouri conditions, cutting back the twigs is almost sure to kill the trees.

Modified Leader System of Pruning

The modified leader type is one in which the central stem or leader is allowed to grow much as in the case of the central leader type, but it differs from the central leader type in that from time to time the leader is slightly suppressed by cutting it back. To produce this type of head, the main stem or the highest branch located near the center of the tree top is allowed to grow a little faster than any of the lateral or side branches about it. The modified leader tree is thus formed by adding each year a length of 18 to 20 inches to the main stem. Upon this a few well placed main branches are allowed to grow. When a height of six or eight feet is reached, the leader, if not already suppressed sufficiently, may be removed.

The suppression of the central leader at intervals generally tends to produce a tree less in height than the central leader and with stronger crotches than are formed in the open head type of tree. Such a tree should have as great a bearing surface and as strong branches as the central leader tree. It has the distinct advantage, therefore, of being lower; and the form of such a tree is usually the one naturally best suited to the particular variety. The tree can be kept more open in the center than the central leader, thus admitting more light. This type of head is generally considered the best one to which trees may be trained and pruned. A more satisfactory fruiting system is established than in either of the other types of tree heads—open head or central leader. The modified leader system of pruning may also be adopted with profit for the pruning of all deciduous fruit trees.

When to Prune

In general, it may be said that the principal work should be done some time after the leaves drop in the fall and before they appear in the spring. Any time during this dormant season when men may work comfortably out of doors, the pruning work may be carried on with profit. With large orchards one of the main problems confronting the grower is the matter of securing labor for the pruning work. The question is not, therefore, so much a problem of when it should be done as it is a matter of getting the labor done. It is true, however, that labor may usually be secured with less difficulty during the fall and winter than during the early spring just as growth is starting.

Pruning Young Trees Until Bearing Age

While the discussion which follows applies more especially to apples and pears, the same principles and practices hold in pruning peaches, plums and cherries.

With the peach, it is important that the trees be headed low and that the fruiting wood be kept near the ground. Bearing peach trees are cut back somewhat more severely than other kinds of fruit trees because the fruit is borne on one-year-old wood. It is important that fruiting wood be renewed and maintained near the main trunk and not too far out on the scaffold branches.

If the young trees are properly pruned at planting time they will not, as a rule, require severe pruning the first, second or succeeding years. It will be necessary, however, to thin out branches here and there and cut back particularly strong growing limbs in order to develop a well-balanced top. For best results, judicious training, light thinning and the suppression of strong leaders is necessary.

At no time is it advisable to do severe pruning unless it becomes necessary to correct an ill-shaped or badly formed tree top. Strong, vigorous trees are, of course, less affected by the wind than weak, slow-growing trees. When trees lean badly toward the east and northeast as a result of the wind, the heaviest pruning should be done on the side opposite the prevailing winds.

Pruning to correct the shape or form of the tree, in order to develop strong branches which will carry a heavy load of fruit, is required. Beyond this, however, severe pruning should be practiced only for the reasons mentioned above. A light pruning each year will keep the branches properly spaced and in balance. Pruning should be reduced to the minimum as the trees come into bearing. It is well known that the most productive orchards are usually the ones receiving the least amount of pruning.

"Will you lend me \$5 for a month, old boy?"

"Listen, stupid, what does a month-old boy want with \$5?"

Figuring the Cost of Growing Apples

By J. J. PICKFORD

Field Horticulturist, Niagara Sprayer and Chemical Co.

IF GROWERS were in possession of fairly definite information concerning the cost of growing fruit, would it have any influence on the chance of making profit? Put this question to a meeting of growers and you would receive widely divergent ideas. A few would reply quite positively, "Yes"; others, about as surely, "No." A somewhat larger number would answer uncertainly, "Some, but we don't know just what." The truth of the matter would lie somewhere between the two extremes.

One grower will say that as we sell our fruit for what we can get, it makes no difference whether the grower knows what his costs are or not. The only thing for him to do is to keep expenses low by curtailing cost wherever he dares. Another will contend that if all growers knew costs, they would force the sales price to a profit-making level. Still another believes that were costs sufficiently high, or made high enough through mandatory regulations covering both production and marketing, it would benefit the fruit industry by elimination of the slipshod grower.

In reality the "careless" grower has, on the average, a high cost, for the easy years happen infrequently. Paradoxically, to make him spend more might result in making his cost less. However, the result, were it one poor grower less, or an added good one, should be a step in the right direction.

Growers Should Know Costs

If the time ever comes when growers actually know instead of guess at the cost of production it will constitute a wonderful experiment in relative effect on profit. In the meantime, there are plenty of other reasons why growers should know certain facts about costs. Too many of us stick our heads in the sand like the proverbial ostrich and nurse the illusion that costs will miss us if we don't see them. Doubtful efficiency. In the fruit game, neglect to pay for necessary items of expense is apt to reduce both profits and orchard value.

Good management attempts to understand each expense item and to decide on the best way to meet it. A shrewd manager does not hesitate to change methods in order to eliminate certain expenses, but will not try to cut an expense that is in itself a source of ultimate profit.

To illustrate: Brown fertilized his orchard heavily with certain unneeded fertilizer elements when only nitrogen was required. Here was unnecessary expense. Smith decided to pass up applying fertilizer, but the orchard was starving, so Smith paid two prices for fertilizer that never was applied.

Again: Brown puts on two or three spray applications each season more than Smith. In three or four seasons out of each 10 such extra expense proves to be unnecessary. But over a 10 year period in short crops, imperfect fruit and reduced orchard worth, Smith pays several times over for a pest control which he never received.

Some growers shrewdly dodge expense by purchasing orchards already brought to bearing age by luckless plungers who have sacrificed spirit and resources playing the game. Sadly enough, many such orchards are not worth their cost.

What Constitutes Cost?

If it is admitted that the facts of cost are a good thing to know, the next steps are to study them out. What constitutes cost? On what unit basis should it be computed? Over what period of time? How to give proper proportional weight to each item as compared to the whole, and how to interpret the total findings are problems to test the caliber of management.

Misunderstanding would be more often avoided if the complete cost and method used were always stated for each special case. Occasionally there are commercial growers who can present cost data from their records.

Is it best to base costs on the acre, the tree, or the package of fruit? The time-period base should represent the years to grow the orchard, the years of good, bad and indifferent crops. Each

year is a chapter, but how many years tell the story in sufficient detail to supply the operator with accurate, helpful information? For the rest of us, in studying such cost analyses, it is quite essential to know how the job of figuring was done.

Some Definite Cost Figures

Complete cost figures are fundamental the base for investigation. Opinions vary among growers concerning the value and necessity of certain items. However, both overhead and operation expenses can be so divided into items and groups

of items that any personal preference should be suited.

To illustrate theory and practice, a few sets of definite cost figures are quoted from Samuel Fraser's book "American Fruits." He states that cost factors entering into apple production are:

1. Labor for maintenance; manuring, fertilizing, pruning, brush disposal, plowing, cultivation, thinning, propping, spraying, cover crop, irrigation where practiced and miscellaneous.

2. Labor in handling; hauling, picking, sorting, packing, hauling to station, cull disposal, etc.
3. Materials used; packages, spray material, manure, fertilizer, gasoline, oil, seeds, etc.
4. Fixed charges or overhead; interest, taxes, insurance, equipment charge, building charge, rentals where made, etc. (Management or superintendence is named as a fixed charge in some instances.)

DISTRICT IN COLORADO (125 RANCHES, 1914-15)

	Per acre.	Per box of whole.	Per cent of whole.
Maintenance	\$ 56.94	\$0.201	23.8
Handling	54.94	.193	22.87
Materials	56.32	.198	23.46
Fixed charges....	71.59	.252	29.85

Total \$239.79 \$0.844 100

In western New York the items and figures for two periods, 1904-13 and

(To Page Fifteen)

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BIJUR CENTRALIZED CHASSIS LUBRICATION

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TWIN IGNITION MOTOR

WORLD'S EASIEST DRIVING CONTROL

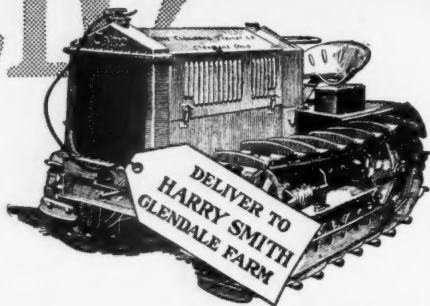
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All motor cars have two prices—the factory (f.o.b.) price, and the delivered price. If the delivered price includes the extras, charged for at retail prices, you'll find your car costing a lot more than you anticipate. Some dealers (not Nash dealers) charge as much as \$50 or \$60 for bumpers alone. On the new Nash "400" you'll find every necessary accessory... hydraulic shock absorbers... bumpers, front and rear... even tire locks... installed at the factory... included in the factory price... at no extra cost. That means a very much lower price, delivered, fully equipped. The Nash "400" leads the world in motor car value!

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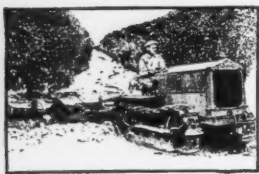
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HEAVY spring work and a big schedule ahead! This month always emphasizes "shortcomings" in equipment—particularly tractors. Why not decide now to buy Cletrac and assure yourself of the dependable power you really need? Hundreds of others are doing it—and their orders are saying "DELIVER AT ONCE!"



Cletrac Crawler Tractors are the ideal power units for every type of work. In orchard cultivation their low build and easy control make it easy to get in close to the trees—and their light tread never packs the soil. For the grower and farmer, Cletrac's abundant power and sure traction make quick work of the plowing and seed-bed jobs and the many other farm tasks of draw-bar and belt.

No other tractor offers such value as Cletrac. No other is so safe on the hillsides, up, down or across. No other combines such power, traction and speed with such low operating cost. Any way you measure it, Cletrac is the tractor for your work.

Cletracs are built in a complete range of sizes to fit every power need. Write today for literature and prices.

The Cleveland Tractor Company

19301 Euclid Avenue

Cleveland, Ohio



THIS study of the codling moth larva "at home" may be scientifically interesting to an entomologist but to you it simply means crop loss. **GRASSELLI Arsenate of Lead** can take the "not" out of the headline above, as far as your orchard is concerned. There is a **GRASSELLI** dealer near you. Ask him—let him help you plan your calyx spray now.

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Established 1839 Cleveland, Ohio

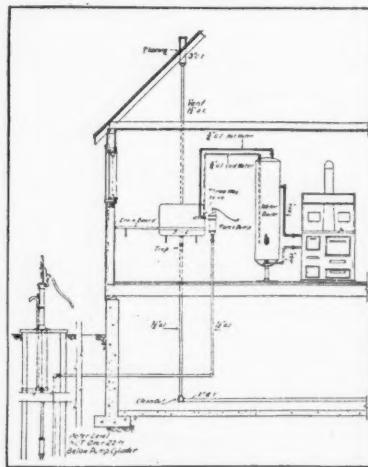
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A Simple Water System

By E. W. LEHMANN

THE SIMPLEST PLAN of getting water into the home and a system which can be installed at reasonably low cost, is to provide a force pump and sink in the kitchen with pipe connections to the well or cistern. This first step toward a complete system does not necessitate the installation of a storage tank, since the water may be pumped directly from the well or cistern to the hydrant.



By providing a three-way valve, a hot water tank and a coil of pipes or water back to the range, either hot or cold water is available. Less than one-third of all the farm homes have a pump and sink in the kitchen, and yet such an installation, without a hot water tank or coils for heating water, can be installed at a cost of less than \$25. The hot water connection, as illustrated, with tank, pipe and faucets, should be installed at a cost of less than \$50.

This plan is the first step in getting water under pressure in the home without the chore of pumping it by hand and

carrying it in. Any farmer who is interested in making the work in the kitchen easier, and is willing to exert a little effort, can make such an installation. Later the addition of pipes for distributing the water to the bath and sanitary toilet, will make the home completely modern. The installation of the simple equipment described will be a part of an entire system. It represents a starting point in making the home modern. Probably no other expenditure for the home would result in as much saving of time and labor as this, because water is not only needed in the preparation of food and in the care of the family, but large quantities are needed in taking care of the clothes and house.

This simple system is adapted for use only where there is a shallow well or a cistern. A suction pump such as would be used would lift the water to a height of only about 20 to 25 feet. The chief requirement is that the low level of the water be no more than this below the pump cylinder.

Ordinarily, there is little danger of the water freezing in this system if the same precautions are taken as when complete plumbing is installed. The system should always be drained if the house is to be left vacant during severe winter weather. When in use, the tank should be kept filled in order to secure the best circulation of water and to avoid damage to the hot-water front or to the coils. If steam is generated, there is no danger as it passes out through the hot water pipe, which is always open to the air.

Water pressure in the home is one of the needs of every farm. A water system of some sort not only eliminates considerable effort in providing a plentiful supply, but also is a partial guarantee that the supply will be free from contamination. The type of pump found on the average farm necessitates pumping at the well, and when a well is not fully protected there is danger of impurities getting in. A properly protected well usually goes along with a complete water pressure system.

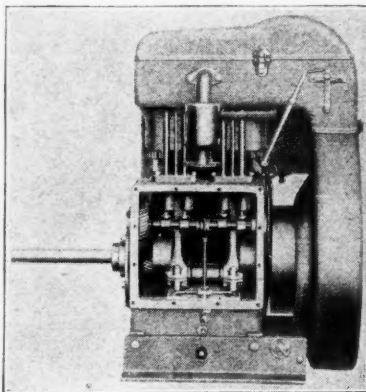
New Air-Cooled Gasoline Engine

A NEW "TWIN" six to 10 horsepower air-cooled engine for farm and industrial purposes has recently been announced. The manufacturers claim for their new engine light weight, together with simplicity of construction, which adapts the engine to certain classes of work which could not be satisfactorily handled by a water-cooled engine.

There are no water pipes, radiator fins, or other parts necessary to water-cooling. It is a valve-in-head type with detachable cylinder head. A large inspection plate may be removed, exposing all moving parts. A distinctive feature is the ease with which pistons may be removed and replaced through the inspection-plate opening. Roller bearings, air-governor, flywheel magneto, float feed carburetor and air cleaner, and lynte connecting rods are standard equipment on this new engine.

The system of cooling is the same as that employed by many air-cooled engines. The flywheel is provided with a series of curved blower blades and as it turns it creates a partial vacuum in the wheel housing. The strong suction effect draws air in and down through the cylinder jackets. The air currents pass over

and between the flanges at fairly high velocity, and, as there is a large amount of exposed surface, the excess heat is



promptly disposed of, being absorbed by air passing around the cylinders, which is ejected from the motor compartment by the action of the blower flywheel.

Cherries Benefited by Pruning

MORE CHERRIES and more vigorous trees have resulted from the proper pruning of Early Richmond, Montmorency and English Morello cherries, with the help of nitrogenous fertilizers, in a series of experiments in New York over a period of several years, according to H. B. Tukey of the Agricultural Experiment Station, Geneva.

If trees are too high for economical picking, or if they have reached an age when they are full of slow-growing, unproductive wood, carrying their crops largely in the tops, pruning and nitrogen

fertilizers will help to remedy the situation. Pruning should consist of cutting to outside lateral branches in the tops of the trees, so as to open them up to sunlight, and the cutting out of dead or unproductive wood. Early in the spring nitrogen fertilizers should be added to give increased tree and shoot growth, larger leaf area, and eventually larger yields. The first season will show a decrease in yield, but in the second season the yield will be back to normal, and by the third season treated trees will out-yield untreated trees.

Figuring the Cost of Growing Apples

(From Page Thirteen)

1914-23, are quoted on a per barrel base. These were Baldwins and 27 years old at the beginning.

	1904-1913.	1914-1923.	Average, 20 years.
Interest on investment	\$0.21	\$0.25	\$0.23
Taxes .....	.012	.025	.018
Tillage .....	.063	.117	.09
Pruning .....	.03	.092	.06
Spraying .....	.096	.154	.125
Cover crop .....	.023	.063	.043
Superintendence .....	.25	.265	.258
Picking, packing, hauling .....	.244	.472	.358
Packages .....	.36	.69	.495

Total

The items may be sorted and assembled to emphasize various facts.

On a barrel basis, figures from one orchard are quoted by Fraser for 1900-14 as follows: Labor made up 38 per cent of the total cost, materials 33 per cent, and fixed charges 29 per cent.

Dividing this another way and allocating labor, we obtain approximately this result.

	Per cent
Fixed charges: Interest 22½c, taxes 2c, machinery 7½c, buildings 3c, management 7½c	29
Package: Barrel 35c	24
Culture: Pruning 4½c, fertilizer labor 1½c, materials 6c, tillage 9½c, seed 3c	17
Picking and hauling: Labor 20c	13
Packing and hauling: Labor 15c	10
Pest control: Labor 6c, materials 5c	7

Obviously, certain items of expense fluctuate from year to year according to the yield, the character of the seasons, the market price of commodities, labor, and also efficacy of management. At that, the orchard business is such that shrewd managers cannot be in on the fat years and skip the lean ones.

Computing Costs

Composite results of the growing years, the crop years and the off years, stated in relation to a package of fruit, tells the story about as fairly as seems possible.

The amount to charge for interest on investment and depreciation on equipment, buildings, etc., would consist of ordinary interest on investment cost plus annual depreciation.

The way to charge orchard real estate investment should be set forth by an expert accountant who is also a practical commercial orchardist. As orchard men, however, we must realize that standing against an orchard from the day of its inception to the day of reckoning is an interest charge on the cost or value of the land, together with planting and growing costs as incurred. Some growers handle this by writing off previously accumulated costs, with net returns as they occur, until, fortune willing, they announce the orchard owes them nothing.

For general use, an equitable method seemingly would be to make an annual charge of interest based on actual investment, although it is claimed by some that the actual market selling price of orchards should be the basis for interest computation. It is true, for instance, that in the vicinity of metropolitan suburbs are bearing orchards which have cost various sums to grow. Some of these orchards and similar land have been selling for \$1000 or more per acre as sub-division propositions. Conversely, there are in other sections of the country many equally good orchards which are being offered for sale at much less than the investment cost.

Which is the right valuation method and is it always right?

Elaborate cost accounting methods involving time records for everything and everybody are all right, but the commercial grower can determine with practical accuracy what he needs to know about costs by working it out from a simple system of expense records. What part of fixed costs should the orchard enterprise stand; what part of labor and materials? Honest judgment and the records furnish the means.

A fairly accurate knowledge of costs might prompt individual orchard propositions to certain lines of action such as: Quitting the business, changing management, changing methods, choosing another location, and so on through various possibilities.

Vineyard Costs Require Four Ton Crop

AT A MEETING of grape growers at Lawton, Mich., recently, Dr. N. L. Partridge gave a graphic resume of the results of two years of cost accounting in 30 vineyards in the Michigan grape belt. He divided the costs into two classes, operating and harvesting. The former, he explained, stay about constant, regardless of the size of crop, and are itemized per acre as follows: Pruning, \$9.34; brush removal, 92 cents; trellis maintenance, \$2.32; tying, \$2.86; tanglefoot, \$1.19; fertilizing, \$5.27; plowing, \$1.08; horse hoe, 64 cents; hand hoe, \$1.02; spraying, \$11.82; plowing to row, \$1.02; cover crop, \$1.52; miscellaneous, \$1; tool depreciation, 50 cents; interest on investment, \$12; taxes and insurance, \$4; total, \$60.04.

He showed that at \$35 per ton, about the present average price, it is necessary to raise about four tons per acre to avoid loss. Also, that the average production is probably a little less than two tons,

which demands a price of \$48.50 per ton or 44 cents per 12-quart basket. A three-advance information and is not by any

HARVESTING COSTS

No. baskets.	Harvesting cost.	Fixed charge.	Total cost.	Cost per ton.	Cost per basket.
110.....	\$18.48	\$60.04	\$78.52	\$78.52	71.4c
220.....	36.96	60.04	97.00	48.50	44.1c
330.....	55.44	60.04	115.48	38.49	35.0c
440.....	73.92	60.04	133.96	33.49	30.4c
550.....	92.40	60.04	152.44	30.49	27.7c
660.....	110.88	60.04	170.92	28.49	25.9c

RETURNS

Price per ton.....	\$25.00	\$30.00	\$35.00	\$40.00	\$50.00
110.....	53.02*	48.02*	43.02*	38.02*	28.02*
220.....	46.50*	36.50*	26.50*	16.50*	3.50*
330.....	39.98*	24.98*	9.98*	5.02†	35.02†
440.....	33.46*	13.46*	6.54†	26.54†	66.54†
550.....	26.94†	1.94*	23.06†	48.06†	98.06†
660.....	20.42*	9.58†	39.58†	69.58†	129.58†

*Loss. †Profit.

ton crop should bring \$42 per ton or 38 to 39 cents per basket.

Dr. Partridge took pains to explain that the foregoing is the result of only

means to be taken as the last word on the subject of cost accounting in grape production, nor really a basis for final conclusions.



INTRODUCE the Family to the International Harvester "SIX-SPEED SPECIAL"

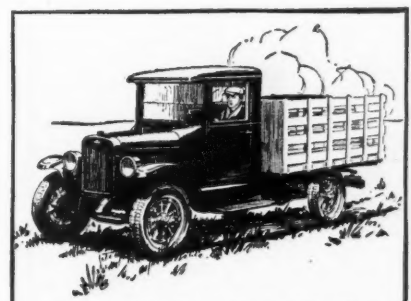
INTERNATIONAL HARVESTER did a big thing for rural hauling when it designed the Six-Speed Special. It stands alone as a truck especially built for this work. Here is a truck with fleet speed for the straight-away—and a 2-speed rear axle providing an extra low-speed range previously found only in high-priced heavy-duty trucks. The low range gives you great tractive power at 3½ miles per hour. It gives you power to get your full loads through hard pulls in fields and roads, deep sand and plowed ground, and on the hills—and that's what the farmer needs in a truck.

Ideal for Farm Hauling

The popular Six-Speed Special is the only speed truck with 6 speeds forward and 2 reverse. Never before could an economy truck pull and climb like this one, and it has high speed for the highways too. It has everything else to match its speed and power—long, sturdy frame, comfortable enclosed cab, heavy-duty springs, an engine simply built and economical in fuel consumption, a transmission with provision for power take-off, and 4-wheel brakes. It has also a practical combination of bodies, adapting the truck to every conceivable type of farm hauling—1, platform body; 2, grain box for 60 bushels; 3, stock rack. Easily and quickly changed from one to another.

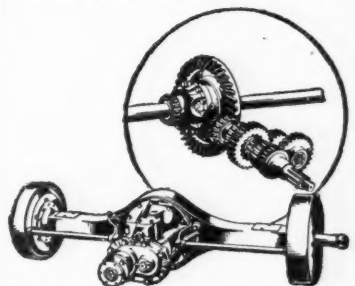
Ask the McCormick-Deering dealer about the Six-Speed Special. We would like to have you drive it yourself and see what the new 2-speed axle and the six forward speeds enable this truck to do in heavy going.

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It Out-Pulls, Out-Climbs, and Out-Performs all other trucks, of similar rating, under full load.

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Kolodust is an improved sulphur fungicide. Its essential ingredient is produced by a fusion process which results in a new, patented material displaying colloidal or soluble properties and consists of sulphur in a new form which is fused with a carrier and is invisible even under the ordinary high power microscope.

This new form of sulphur has proven toxic properties far more powerful than any other known forms of sulphur with which it has been compared. It "sticks through rain and wind", thus prolonging the protection period.

KOLOKIL is Kolodust with poison added to kill the external chewing insects—producing an insect-fungicide.

Send your name and address with this ad. We'll return the sample of Kolodust for the test, and full dusting information.

NIAGARA SPRAYER AND CHEMICAL CO., INC.

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Middleport, N. Y.

Niagara KOLODUST

MAKE THIS TEST

Place a few drops of water on a piece of dark paper, and apply a thin film of Kolodust.

Make the same experiment on a second piece of paper using any other sulphur dust.

Allow to dry, then compare.

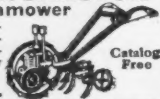
Ordinary sulphur dusts ride the drop.

Kolodust diffuses through the drop leaving a protecting film over the entire area.

Send for demonstration sample.

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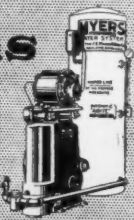
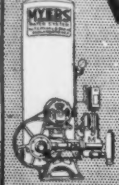


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A New Fruit for the Northern Table

A FRUIT that is comparatively little known in the United States but which promises to become a crop of considerable importance is the papaya. This



The Papaya tree

is a tropical fruit adapted to outdoor culture only in south Florida. It is propagated from seed, taking eight months from time of planting for a plant

to mature fruit, and has a bearing period of from two to four years. It forms a single stalk growing to about 12 feet in height, with a leaf resembling that of a castor bean. The fruit is borne singly or in pairs close to the stalk and ranges in weight from one to 20 pounds. As high as 500 pounds of fruit have been borne by one plant but 100 is near the average. For commercial marketing, a size near that of a muskmelon seems desirable.

The fruit somewhat resembles the muskmelon in flavor and is sometimes called "Melon Fruit." It is prized highly as a health food, as it is rich in papain, an enzyme similar to pepsin, a well-known aid to digestion.

Papayas grow wild in south Florida but these have no commercial value, being small and of poor flavor. However, of late years there has been valuable work done in improving varieties. This improvement has been accompanied by an increased demand for the fruit.

Last winter retail prices ran around 25 cents per pound. This led to unusually large plantings in the spring, with the probability of a surplus for shipping North. As a leading grower says that a yield of 60,000 pounds per acre can easily be grown and will return a profit of two cents per pound to the grower, and as there is a growing demand for foods with health-giving properties, it appears that there is a bright future for the papaya growing industry.

The fruit is also being used in candies, preserves and marmalades, which will eventually be distributed all over the United States.—T. R. Baumgartner, Florida.

English Market for Georgia Peaches

SHIPMENT of Georgia peaches to England may form a new and profitable outlet in the marketing of the state's peach crop. It was recently learned, following a conference between W. C. Bewley, manager of the Georgia Peach Exchange, and James Somerville, Jr., of London, representative of the department of commerce of the trade commission in England.

"While the English people have peculiar ideas about the fruit they eat," said Mr. Somerville, "these ideas come as a result of their experience. For example, they do not like yellow peaches, since all that are grown there by protected walls or in hot-houses are white. And they do not want red meat watermelons shipped from this country. Why? Because the only watermelons they are accustomed to are small ones, shipped from Spain, which have yellow meat."

"This means that Georgia peach growers will be compelled to conduct an educational campaign to convert the British fanciers to the superior flavor and quality of Elbertas before they can be sold to any great extent."

"However, Georgia peaches come in a season which, if early enough here, will make the shipments to England very profitable."

"Peaches from Italy reach England in August and September and those from South Africa during three months in the winter. These, as well as those grown in English hot-houses, are only for the very wealthy and sell for as high as 50 cents a peach. The only competition to the Georgia peach will be very delicious pears from Europe, which are shipped to England during the peach season."

Mr. Somerville urged special care in selecting and packing peaches for shipment to England. Those sent over heretofore, he said, have been packed without wrapping and padding, and many have not stood the long voyage well.

He suggested that specially treated paper and wood wool, such as is used for packing by the Italian and South African growers in shipping to England, be used, and expressed himself as confident that a market for many Georgia peaches might be built up in England during the next few years.—J. H. Reed, Georgia.

A One-Man Spraying Outfit

WE ARE used to seeing descriptions and photographs of rebuilt or newly designed spray machines of the home-made variety. The outfit pictured on page 26 is unique in that it has given excellent results over five years of use. This machine was built by Lloyd Balderson for use on his 35-acre orchard, near Colora, Cecil county, Maryland.

The running gear is a Ford chassis, reinforced by heavy timber frame. The timber supporting the tank rests directly upon an independent axle, to which are fitted the large tractor wheels. The original shaft, differential and axles of the Ford are so hung that they can propel the rear wheels. The inside rim of each tractor wheel is fitted with sectional gear teeth, into which a "star wheel" or four-toothed gear wheel is meshed. In other words, the old Ford wheels were replaced with "star wheels" and these wheels work in the gears inside the tractor wheel rims.

The machine is easily run in high gear and at any reasonable speed.

A Bean triplex pump is mounted just in front of the tank, and power is supplied from a take-off from the motor crank shaft, by chain drive, located up front where the motor is cranked for starting.

The operator steers, runs the rig and sprays, and there seems to be no extra effort involved, the operator spraying large and small trees alike. The four-nozzled rod as developed by Dr. W. S. Hough at the Virginia Experiment Station is being used.

Since the photographs on page 26 were taken, the steering wheel has been extended so that the operator may drive while standing in the tower on top of the tank, and wooden treads have been arranged so that the spray rig is under the full control of the operator.—A. F. Vicheller, Maryland.

Grape Anthracnose in Southern Vineyards

By V. H. YOUNG

Arkansas Agricultural Experiment Station

THE RAPID INCREASE in the acreage of grapes grown in the South is resulting more and more in the realization that only he who is willing to fight diseases and fight them hard is going to survive in the grape-growing game. In the Ozarks of Missouri and Arkansas and in many other more northerly sections of the southern grape growing regions, the Concord is principally raised and since this variety is highly resistant to anthracnose and is susceptible to black rot, the idea has grown up among many growers

control than black rot, severe damage is apt to result.

Appearance of Disease

Anthracnose or bird's-eye rot is a dis-

larger leaf veins, prominent, irregular, dark, sunken areas occur. The canes are often completely girdled by these cankers. The cankers are very striking and much more prominent and noticeable than the cankers of black rot. They also lack the minute, black, raised, pimple-like fruiting bodies (pycnidia) which are found on all parts affected with black rot.

Arkansas Spray Schedule for the Grape

WHEN TO SPRAY	WHAT FOR	MATERIALS
1. Before the buds swell in the spring.	Anthracnose.	1 gal. commercial lime-sulphur to 9 gal. water.
2. Just before blooming.	Black rot, anthracnose and flea beetle.	Bordeaux mixture and 1½ lbs. dry lead arsenate to 50 gal. of water.
3. Immediately after blooming.	Black rot, anthracnose and grape berry moth.	Bordeaux mixture, 1½ lbs. dry arsenate of lead and 1 lb. resin fish-oil soap to 50 gal. of mixture. Same as in No. 3.
4. Two weeks after No. 3.	Same as in No. 3.	Neutral copper acetate 1 lb. to 50 gal. water.
5. Two weeks after No. 4.	Black rot and anthracnose. (This spray may be omitted when grapes are relatively free from insects and disease.)	

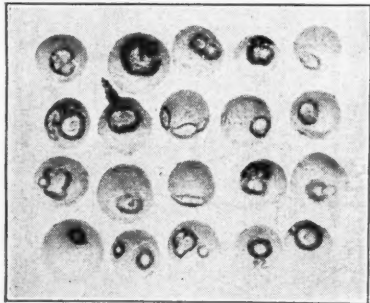
ease of leaves, canes, tendrils and fruits, in fact, it may attack any green, succulent part of the plant. On the leaves the disease appears as small, irregular, dark-brown spots. On tendrils, shoots and the

On the fruits, anthracnose produces the typical bird's-eye rot, very different from the soft rot and mummy stages so well known in the case of black rot. The spots are first of a dark reddish-brown appear-

ance, and they gradually enlarge until they are about one-fourth inch in diameter with a more or less circular outline. The center of the spot becomes grayish-pink in color, while the border remains dark. Often a well-defined band of bright red appears between the central grayish-pink and the dark border. As will be seen from the illustration, the spots with their different zones of color resemble in a rough way a bird's eye, hence the name bird's-eye rot. Again it should be noted that the black, pimple-like fruiting bodies so typical of black rot are never present on the fruit.

Treatment

Anthracnose of the grape is carried over winter on the diseased canes and for this reason thorough pruning to remove the diseased canes is necessary. The diseased canes should be burned before the beginning of the growing season. It has also been found that a dormant spray in addition to the regular schedule for black rot is necessary for anthracnose control. This dormant spray should be applied before the buds swell in the spring and should consist of 1-9 commercial lime-sulphur. Above is given the complete spray schedule for grapes as recommended by the departments of plant pathology and entomology of the Arkansas Agricultural Experiment Station. When anthracnose is not a factor, the dormant spray should be omitted.



Anthracnose or bird's-eye rot on the R. W. Munson variety. Note lighter colored center surrounded by darker band. In the originals, a reddish zone, not distinguished in the photograph, occurred between the dark margin and the grayish pink center

that the latter disease is the only one of importance in the South. However, in many sections other varieties, such as Ellen Scott, Catawba and a number of the hybrids originated by R. W. Munson, are being planted. Many of these varieties are just as susceptible to anthracnose as to black rot, if not more so, and since the disease is considerably more difficult to

Laying Spray Pipe with Tractor and Subsoiler

MANY GROWERS who have seriously considered installing stationary outfits have balked at the amount of labor involved in digging the necessary series of trenches to receive the pipe line. But a western grower, Ralph Sundquist, Wenatchee, Wash., solved this difficulty in a very ingenious manner.

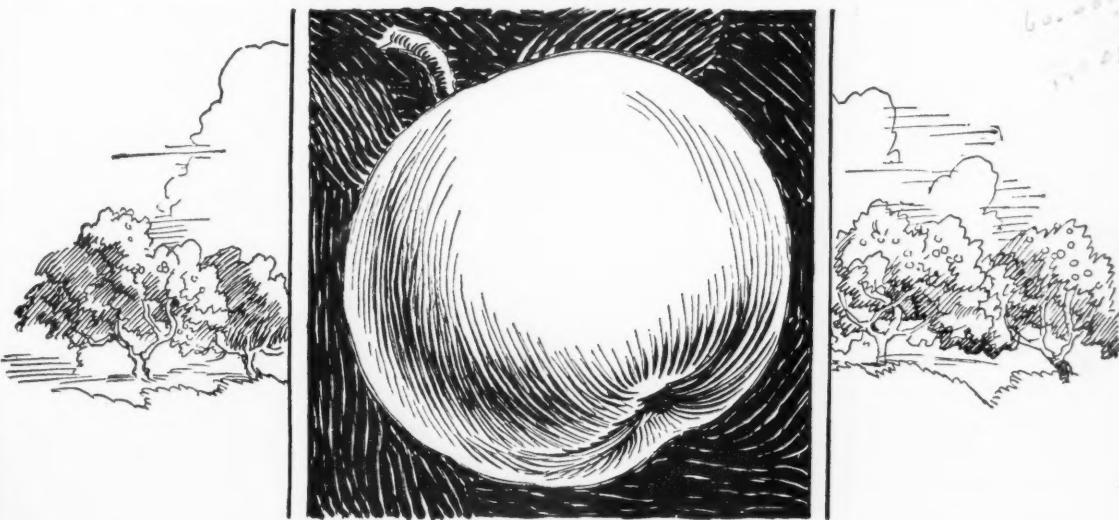


Some 13,000 feet of pipe were purchased which were joined together in sections of 400 to 600 feet each. Hooking this subsoil plow to his tractor, he pulled these sections into the ground at the required depth with no excavation except for small pits at the junction of the long sections.

The cost for the two men and the tractor employed was estimated at \$35. The cost of making the connections was \$15. Thus, 13,000 feet of pipe were connected and laid at a cost of \$50.

The only special equipment necessary is a hook welded to a threaded cap the same size as the pipe. This and its method of attachment to the subsoiler is shown in the accompanying picture. On page 26 is another view showing how the pipe was started underground through a small trench.

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FOR APPLES: Now's the time to control scab. Get rid of last year's hang-over infection first. Plow under the fallen leaves as soon as the weather permits. Then—when the new leaves are mouse-ear size give the orchard a thorough spraying with "Orchard Brand" Oil Emulsion or Bordeaux mixture. Next the cluster-bud application—equally important as the means of preventing scabby fruit.

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The bugs are just around the corner



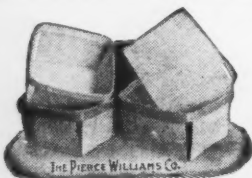
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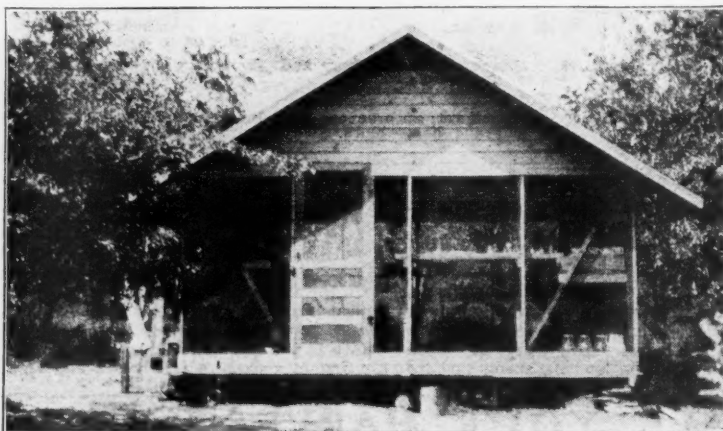
Codling Moth Control in the Pacific Northwest

(From Page Nine)

as an aid in reducing infestation in the orchard has become more and more apparent, although most entomologists believe, as pointed out by Mr. Spuler at the Wenatchee meeting in 1926, that their greatest value lies in determining

posted at frequent intervals along the highways in the valley and the data thereon referred especially to moth emergence in a nearby orchard.

Information of this kind has been of untold value to apple growers in the Wenatchee valley during the spraying



Outdoor insectary for codling moth study—Wenatchee, Wash.

more adequately the proper time for applying cover sprays in the orchard.

The most extensive attempt to utilize moth traps in actual practice was carried out in 1928 by the state department of agriculture, under the supervision of George E. Harter, district horticultural inspector, Wenatchee. Some 80 co-operators aided in the undertaking. Bait traps were observed daily during the summer months in a large number of orchards in the Wenatchee valley and the results tabulated on large sign boards from day to day as indicated in the accompanying picture. These boards were

season of 1928. A marked increase in the number of moths captured indicated that a cover spray was necessary within the next 10 days, since large numbers of eggs likely would be deposited and would hatch during that period.

At the present time much dependence is placed on the use of moth traps in the Northwest to determine spray dates. That they may also be of considerable value in reducing the moth population in orchards, resulting in fewer cover sprays being required, was another point on which still further data was obtained during last year's work in the Wenatchee valley.

The Price We Pay for Fruit Profits

ETERNAL vigilance is the price we pay to secure good fruit from the orchard. It matters little how fine trees one may have; good or even satisfactory results cannot be secured unless the proper cultivation, pruning and spraying are given every year. We have found this especially true of spraying, because unless sprays are applied insects and diseases will either kill the tree or destroy the fruit, or both. The fruit tree can put up, to a certain extent, with rather indifferent treatment as to pruning and cultivation for a short time, but it cannot put up with indifferent treatment as regards protection from diseases and insects. I have been growing fruit all my life and I know the absolute necessity of keeping up the spray schedule on all fruits.

Experience has proved to me that thinning will not lessen the number of pounds of fruit that we get from the trees, but it does, of course, lessen the number of individual fruits. But we get much larger fruits, usually better in quality, that look better, taste better, sell better, and bring more money. Where one has only a hundred trees or so, it is imperative to get the choicest fruit. In thinning, I wait until after the "June drop" has taken place. We thin our peaches just before the pits begin to harden. Two weeks later we thin the apples.

I thin the peaches so they will be from four to five inches apart and the apples from six to eight inches apart. With small varieties of apples, I find six inches apart the most profitable practice, but with larger ones I consider eight inches not too much. To produce especially fine fruit to exhibit at fairs, I thin so the fruit will be from 10 to 12 inches apart. Of course, one does not want abnormally large apples to exhibit at fairs, but they should be large, smooth, well developed in every respect, and of

the same type. Where fruits have an abundance of room on the trees, their development is always more complete than if they are crowded. The same proposition holds true for pears and other fruits that one may be planning to exhibit at a fair.

We pick up from the ground all peaches, apples and other fruits that drop from the trees. These are apt to be diseased and a constant source of re-infection for fruits that are unblemished. We go over the orchard two or three times a week and pick up all these fruits and feed them to the hogs. This we find goes a long way toward reducing future trouble from disease and insect pests.

We give peaches the last spraying four weeks before the variety ripens, using either dry-mix sulphur-lime or self-boiled lime-sulphur.

We cultivate the orchard until the cover crop is planted in July, using a disk harrow for the purpose. I believe the peach orchard should be disked every 10 days or two weeks.

Scab is the most serious disease of our pecans and unless controlled causes a large percentage of the nuts to fail to open or develop. Bordeaux applications, we find, give good control for this and several other less important diseases.—Thomas Hooten, Texas.

L. E. Longley of Cornell University, Ithaca, N. Y., will, on April 1, become assistant professor of horticulture, in charge of floriculture and landscape gardening, at the University of Minnesota. He will be stationed at University Farm, St. Paul.

Sambo—Rastus, dat tie what yo' all got on shuah am a flamer!

Rastus—Dis tie is supposed to be a flamer, niggah, 'cause Ah bought it at a fire sale.

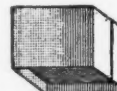


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BOOK DEPARTMENT,

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Merits of the McIntosh

By M. B. CUMMINGS
University of Vermont

THE MCINTOSH APPLE, admired and enjoyed by all, has come to be a great asset to New England. Although originated 131 years ago, we have just begun to appreciate its value.

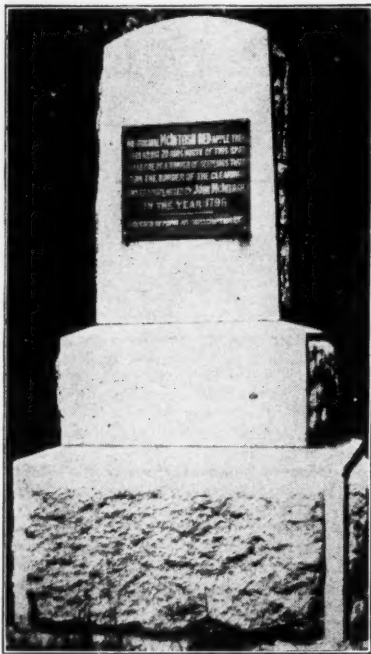
It was "born" in Dundela, Ontario, where as a seedling it was discovered by John McIntosh. The original tree lived for 112 years and was destroyed by fire in 1908, when a house near it burned.

This seedling, first called Grany, deserved a better name and was renamed

the grounds of Charles Reed, who said it had always done well since it came into bearing, and seemed good for another 30 years.

There has been ample justification for its extensive use in northern New England orchards. In fact, every large orchard in Vermont has a generous quota of this variety, and many growers wish they had nothing else, because McIntosh is so profitable. Even in 1926, McIntosh of the best grade from Vermont sold for \$9, in contrast to \$6 for Greenings and \$3 for Wealthy. In 1927, McIntosh from many Vermont orchards sold at prices ranging from \$10 to \$14, depending on the quality, and in 1928, the variety in best grades brought \$11 in New York City.

The McIntosh tops the New York market, bringing the highest prices. Fully three-fourths of the apple trees set in Vermont during the last 15 years have been of this favorite kind. Long may it live and continue to be supreme. We owe a debt to Canada for giving the McIntosh apple to the world.



Monument erected to the original McIntosh apple tree in Dundela, Ontario.

McIntosh, after the discoverer. It was propagated in quantity as early as 1870 by Allen McIntosh. Now, after 57 years, it has come to have a place in nearly every commercial orchard in New England, it has become a standard sort for grower, dealer and consumer, and is worth millions of dollars to New England horticulture.

Merits of the McIntosh

The McIntosh is well adapted to the cold climate in New England and other northern states. It possesses hardiness and has weathered our severest winters. With the possible exception of Fameuse, Wealthy and Northwestern Greening, no other variety of good quality has come through the severest weather of the last 20 years in Vermont so well as has the McIntosh. Hardiness is fundamental to any commercial variety of apples for any northern state.

It would be unfair not to mention the superior quality of the McIntosh, undoubtedly its greatest asset. No other variety quite equals the McIntosh in whiteness and crispness of flesh, palatability and aroma. The juiciness of its flesh fairly makes the mouth water.

It comes into bearing at an early age, trees of this variety often bearing the third year after planting. Good crops are received six or seven years after planting. In this regard the McIntosh scarcely has an equal. McIntosh trees are often in their years of prime production before Northern Spy trees and many other kinds have begun to bear.

However, no apple is perfect and the McIntosh has some defects. It is likely to drop prematurely, it is very subject to scab, its endurance in storage is rather limited, and it is self-sterile. But these weaknesses are not sufficiently serious to balance its virtues.

Forty-Year-Old Trees in New York

McIntosh has every indication of being a long-lived tree. In August of 1928 the author of this article saw a 40-year-old tree of this variety at Peru, N. Y., on



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Any recommendation which the Tobacco By-Products Co. makes regarding the use of any of its products is always based upon Experiment Station evidence and other careful tests.

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E. A. Motz, Dept. of Horticulture, V. P. I.
Brooks D. Drain, Massachusetts Agr. College
Entomologist N. Y. State Expt. Station;
And others in the February number of the American Fruit Grower.

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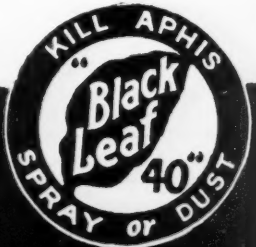
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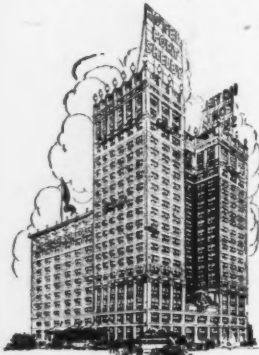
And now there's a new, easy-to-open top on the Beech-Nut jar. Lift the edge, and it's off. And it slips back on just as easily.

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CHATS With the Fruit Grower's Wife

By HAZEL BURSELL

Plant Annuals Now

FLOWERS, vines and shrubs can make the plainest, most uninteresting house seem lovely, and by the same token the lack of them can destroy all illusion of beauty in what may otherwise be a beautiful home. This fact is well known to laymen as well as to landscape artists. It is also a well-known fact that beauty in any form brings peace and enchantment into the lives of its possessors. Therefore, it behooves each and everyone of us to strive to beautify our particular little nook on God's footstool.

We may not all have the means for beautiful evergreens and flowering shrubs, but we may all have such an abundance of flowers and vines that the more expensive shrubs will not be missed, except in winter. And best of all, we may have this riot of beauty for a small expenditure for good seeds and some careful study and hard work. But we must act quickly if we are to get much enjoyment from our plantings this year, as April is the last advisable date for planting annuals.

Consider Ground Space

First of all, consider your ground space with special attention to type of soil, amount of available water, sunshine and shade, and the shapes, sizes and locations (with respect to buildings, fences, etc.) of flower beds. Then study a reliable seed catalog to ascertain the special requirements of the various flowers and determine which best fulfill your needs.

In general, practically all annuals will do reasonably well under average soil conditions, but some will do better than others under certain conditions. For instance, there are flowers that thrive in the shade and others that require the full sun, while still others can stand a dry soil and others require much moisture. Some portions of the border may need low growing flowers while others should be planted to tall bushes. In this way make your selections and then place your order for good quality, medium priced seeds from a reliable firm.

Plant the seeds in specially prepared seed beds according to instructions for each type of flower. Instructions are given in the catalogs and on the seed packets. Mark each planting so that the young seedlings can be identified later. Cultivate, weed and water the seed beds until the plants achieve their first or second set of true leaves. Then select a cool day and carefully transplant to their proper place in the flower beds and borders. Continue the watering, feeding and cultivation as is needed and you will be rewarded for your labors a hundredfold in the form of lovely flowers.

A few of the annuals which are inexpensive, easy of cultivation and prolific of bloom include the following: stocks, zinnias, marigolds (African, French and Dwarf), sweet alyssum, sweet peas, balsam, petunias, larkspur, cosmos (single, double crested, and ray flowering), poppies, clarkia, evening primrose, asters, ageratum, pansies, snap dragons, nasturtiums (trailing and dwarf), lace flowers, love-in-a-mist and pincushion flowers.

Save Seeds Yearly

Many of these will seed themselves from year to year so that new seed need seldom be purchased. With others seed may be saved for the following season from the strongest and most beautiful plants of each type. Thus annuals will be found very inexpensive to cultivate.

Certain of the common and most favored flowers can best be grown from tubers or bulbs. In such cases the only cost is the original purchase price of the bulbs or tubers as they will increase from year to year and your plantings will become larger and larger. You will find that any surplus bulbs, tubers and seeds may be readily exchanged with other growers for other kinds and varieties. Included in the bulb and tuber class are gladiolas, dahlias (dahlias can also be

raised from seed), cannas and iris of many kinds.

When ordering seeds, it will also pay to order the seeds of a few easily grown perennials and biennials to insure future bloom without such constant effort. Among the favored biennials are Canterbury bells and fox gloves. Choice perennials include delphinium, columbine (both long-spurred and common varieties), California poppies, sweet William, chrysanthemum (starts from slips or roots) and Michaelmas daisy.

Vines Add Beauty

VINES alone will do much to cover unpainted buildings, unsightly corners and unlovely fences. In addition, they lend an air of coziness and provide much desired shade in summer. Further, they may be employed for their beauty alone, leaving other and more ulterior motives out of consideration. In this group you may choose from purple, rose or white clematis, trumpet flower, cardinal climber, wisteria, moonflower, morning glories, ivy, honeysuckle, Virginia creeper, and the various rambler and climbing roses.

When beauty comes in small, gayly decorated seed packets and for very nominal sums of money, then there is no excuse for tolerating ugliness.

Make Your Kitchen Inviting

SOMETIMES we moderns sacrifice really useful and decorative objects in our kitchens by our abject subservience to the gods of efficiency and cleanliness. In our passion for completely built-in kitchens, we lose many of the touches of quaintness and charm that could be ours.

We are all intrigued by pictures of colonial and pioneer kitchens with their big utensil festooned fireplaces, Dutch ovens, quaint cupboards, wall shelves, corner shelves, chimney shelves, and scoured work tables, not to mention the famed cookie jars, doughnut jars and bread crocks in their accustomed places, or the shining array of pots and pans hung in convenient places, or the candlesticks, demi-johns, jugs and jars on their special shelves. These kitchens may have been, as their critics claim, far too large, with too many things exposed to the dust, but we must admit they were interesting, charming and—yes, inviting. I'm not advocating that we go back to the pioneer kitchen. Far from it! My point is that there are certain features in the colonial kitchen that we could well retain in our admittedly more efficient and sanitary kitchens.

Shelves Are Interesting

Take the matter of shelves, for instance. Think what a boon a cleverly-shaped wall bookshelf would be to the average housewife! On it she could place her recipe box or boxes (they now advocate one box for favorite recipes and another for new and untried ones), stain removal bulletins, her chosen cookbooks, with possibly a low squat colorful jug or pottery bean pot holding a few appropriate flowers. The shelf itself could be made of light veneer with two or three shelves graduated in width and fitted into shaped end pieces. The kitchen wall would form the back. The bottom shelf would be the widest and would therefore support the largest and heaviest recipe boxes and cook books. The wall shelf would be painted in one or two colors to harmonize with the kitchen color scheme.

In addition to this utility wall shelf we might have one or more corner shelves made with triangular shaped shelves fitted into ornamentally shaped side pieces. This type of shelf should be tall and narrow rather than low and squat for the best effect. This, too, would be painted to match the other colors used in the kitchen or breakfast nook. Such a corner shelf would appropriately hold interesting bits of gay colored pottery, a quaint candlestick and sometimes a low bowl of flowers.

We may have several of these shelves of different types, all open-faced, and gayly painted, and charming. Still another type of shelf would be a plain, square cut, less ornamental group of two or three shelves with a row of small, shining cooking utensils hung under the lower shelf. Would not such a grouping make an effective picture without detracting in the least from the general efficiency of our kitchens?

Have a Cookie Jar

Then, what is to prevent us from making use of the cookie jar idea? Why not have a gayly painted cookie jar, bread crock and cake box, and keep them out on a shelf, drain board or work table? Nothing could be more decorative or enticing to old and young alike! The cookie jar and cake box need not always be kept filled, as they were in colonial days, but they will be found most convenient on baking days. It goes without saying that every kitchen has need for a practical yet pretty bread box.

Did I hear someone rise up to say that her kitchen was so dark and dreary and hopelessly uninteresting that it was not worth fixing, and could not be fixed up anyhow? Well, if you have no immediate prospects for a new house and the old kitchen must serve, you might as well fix it up so that you will enjoy the time spent there, instead of being depressed and down-hearted.

Try repapering the walls in a nicely patterned washable wall paper, giving the ceiling a fresh coat or two of calomine, and the enameling woodwork some light, agreeable color, either gay or neutral in tone, depending on individual taste. In general, we would say to use a warm color, such as orange, yellow, lettuce green, or warm ivory in a dark room with north exposure, or such cool colors as blue, orchid, gray or sage green, with a touch of warm color, in the well-lighted kitchen. If the room is large and there is a quantity of woodwork to be painted, be sure to use quieter, grayed tones of the chosen colors if you wish the best effect. Unmodified gay colors may be used in smaller rooms.

Linoleum on Floor

When painting the woodwork, give all wooden kitchen furniture, such as chairs, stools, cupboards and cabinets, one or more coats of enamel and see what magic can be wrought with paint and a brush. If the floor is stained and worn, have it smoothed and padded with sawdust and burlap; then lay a good quality of ingrain linoleum in one of the new, interesting patterns and colors. You will never cease to bless the day that your linoleum was laid! If you positively cannot afford new linoleum, you may have the floor smoothed and sanded, and then paint it, using one or more coats of underfinish, one or two coats of good floor paint and finally a coat of clear, colorless waterproof varnish.

Now add the suggested "charm" touches, such as wall book shelves, corner shelves, bits of pottery carrying out your color scheme, and last but not least, the cookie jars, bread crocks and cake boxes. Be sure to place a comfortable yet practical chair near the book shelf so as to provide a "rest nook" to be used when a few spare moments are available from everyday tasks. It might even be well to keep a favorite household magazine on the book shelf for these same spare moments.

Let's not be content with uninteresting kitchens any longer!

Emergency Supplies

BLESSED by complete peace of mind is the housewife who maintains a well-stocked emergency shelf in her pantry. She can meet the unexpected luncheon, dinner or week-end guest with perfect poise and charm and without a trace of embarrassment, for she knows she has the makings of any number of adequate and satisfying meals in con-

venient form among her emergency supplies. The guests of such a hostess cannot but feel that they are really and truly welcome.

The list may vary somewhat during the various seasons of the year. For instance, during the summer months she may want to increase her picnic and camping supplies. Then, during the winter months she may want richer foods, in the line of canned meats, plum puddings, mincemeat and fruit cake on hand. For summer, she would also greatly increase her supply of beverage materials. The source of part of her supplies will be home canning, drying and baking, while another group will consist of commercial products. The amount prepared at home will depend on the available supply of raw materials, and will therefore in all likelihood vary from year to year and season to season. For instance the housewife may have beef to can, both in the form of meat and in the form of broth, one year and then none for several succeeding years. Another year she may have the opportunity to put up a supply of a favored fish.

Emergency Supplies Listed

Here is a list of emergency supplies which should prove "life-savers" in time of need in any home:

Soups: Tomato, vegetable, chicken and clam.

Meats: Corned beef, chipped beef, boned canned chicken, bacon, ham, and any home canned meats available.

Fish: Tuna, salmon, sardines, oysters, crab and minced clams.

Desserts: Marshmallows, cookies, fresh or in tins, pineapple (both sliced and grated), walnuts, dates, plum pudding, fruit cake, mincemeat, raisins, apples, and a large variety of canned fruits and jellies.

Sauces: Catsup, mustard, horseradish, tomato and chili.

Vegetables: Peas, string beans, lima beans, canned baked beans in tomato sauce, corn, olives, pimentos, tomatoes and pickles.

Extras: Eggs, cheese, crackers, butter, salad dressings, gelatin, fruit gelatin, lemons, powdered sugar, canned shredded coconut, tapioca, spaghetti, macaroni and rice.

May Modify List

This list may be somewhat more extensive along certain lines than the average housewife would want to keep on hand. She can study the list carefully and from it work out one that meets her own particular needs more adequately.

No mention is made herein of the ordinary household supplies, such as spices, brown and white sugar, syrup, chocolate, molasses, cocoa, tea, coffee, cornstarch, flour, cereals, etc. It is taken for granted that the supply of these staples would be kept up in any household.

Knife Set Useful

HOMEMAKERS who have a really adequate set of kitchen knives vouch for the fact that they are one of their most useful possessions. Every workman needs the proper tools no matter what his line of endeavor, and the housewife is no exception. One knife for all purposes is not enough. She needs several, each filling their special need.

In the first place, they should all be of stainless steel, and of good quality so that they will "hold an edge." Then each one should have a special place in a neat rack or drawer convenient to the work table. Some manufacturers furnish a suitable rack for their sets of knives. An adequate and practical list would include two paring knives, with two sizes of blades, two larger utility knives, a bread knife, short handled and long handled forks, a medium sized spatula and a large spatula. The housewife will find after she owns one that the last named article will be used in countless hitherto unexpected ways.

If you want to add interest to your work and at the same time to your final food products, you should add a few simple, inexpensive French vegetable cutters. The most useful ones would be the "ball" cutter, the "shoestring potato" cutter, and one that cuts rounds of vegetables or solid fruits, the rounds being distinguished by ridged and corrugated surfaces on the two flat sides or by scalloped edges.

Malaria Takes Toll of Human Life

By MARY LEE ADAMS

SOON the voice of the mosquito will be heard in the land. Unwelcome as any mosquito, whether tuneless or dumb, must be, our dislike changes to positive hostility if the insect belongs to the tribe of Anopheles or malaria-bearing mosquitoes.

If you live in a blessed region where malaria is unknown, you may take but a languid interest in the causes and cure of this devitalizing malady. But if you have ever burned and shaken with chills and fever, you know not only the misery of the moment but the devitalizing results of long continued malaria. The power of resistance being weakened, the sufferer may readily succumb to any one of several ordinary diseases.

What Can We Do?

Many persons can recall the time when malaria was supposed to be caused by miasmas that rose in warm weather from swamps and marshes. It is now established that the danger of these low wet spots is that they serve as breeding grounds for the malaria mosquito. Not only swamps and marshes, even so small an area as a mud puddle in a neglected

run or the rain water caught in a discarded tin can, may serve as a hatchery.

To drain swamps and marshes effectively requires community effort or even government aid, but individuals can do much. Every householder can watch the rain barrel and the water-filled vessels, however small, lying about the premises. They must either be closely covered, emptied or skimmed over with kerosene oil. Small, ornamental garden pools may be safely retained by the introduction of gold fish whose appetite takes care of the mosquito eggs.

Complete screening of houses offers considerable protection. If this is too expensive, let every bed be furnished with an old fashioned mosquito net. The temptation of these to children is great. Playing tent under them at the bedtime hour is apt to let in as many mosquitoes as are kept out.

"Quinization"

In the matter of personal care and cure, persistent dosing with quinine gives the

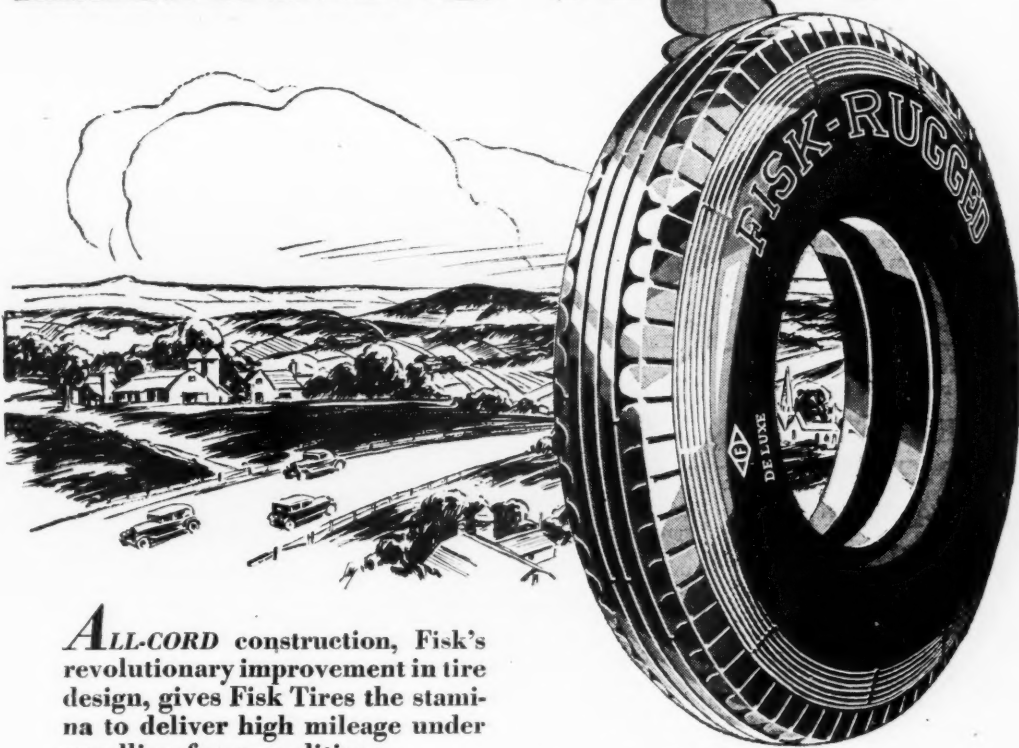
best results. It is recorded that in Italy, where a great campaign was launched several years ago against this pest, the malaria rate was reduced from about 70 per cent to four per cent through mechanical protection and what is called the "quinization" method.

The latter should be followed under the advice of a physician. Quinine is a supremely bitter drug and maybe the doctor, if he be kind hearted, might let you take your daily ration in chocolate covered tablets.

Airplanes Spray Poison

The government method of spraying poisons from airplanes upon mosquito-bearing localities is utterly modern and interesting. The Panama canal was driven through at terrific cost of life. Much credit is due to those who used all the then known methods of mosquito control. If the Nicaraguan canal project is carried out, it will be hovered over by humming wings of planes dispensing poison over the marshes and stagnant waters, killing the mosquitoes and saving the lives of men.

mileage



ALL-CORD construction, Fisk's revolutionary improvement in tire design, gives Fisk Tires the stamina to deliver high mileage under gruelling farm conditions.

This better process, exclusive with Fisk, does away with chafing cross strings in the fabric that cause internal heating. The frictionless Fisk carcass is made of cord alone, preventing wear inside the tire and saving the strength of Fisk

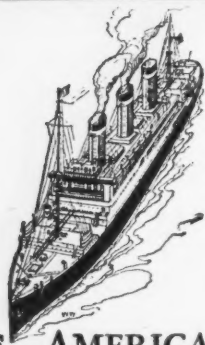
Tires to resist the wear of the road.

Because of this All-Cord construction, Fisk Tires roll easier, generate less heat, last longer. Their All-Cord process, the thicker tougher tread, the perfect balance in every part insure economical mileage under all conditions.



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Get a FISK
"FISK" MARK TIRE - 8.00 PER PAIR

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THE fast freight services operated for the United States Shipping Board provide ready means for exporting surplus American farm products. Operating under the American flag, these services bring true American efficiency to overseas transportation. There are 20 lines in all with a total of 256 ships sailing regularly from Atlantic Coast, and Gulf ports for all parts of the world.

The speed, safety and dependability of these services have made them an important factor in the world-wide expansion of American industries. Every year they successfully carry many millions of dollars' worth of farm products and manufactured goods.

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PASSENGER SERVICES: Luxurious passenger accommodations are available on the fine liners of the United States Lines, which include the famous Leviathan, world's largest ship. The American Merchant Lines vessels, sailing weekly, offer comfortable passage between New York and London at reasonable rates.

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Modern Methods in Orchard Tillage

ONE OF THE greatest strides in orchard tillage has been the adoption of disk implements in place of the moldboard plow. The first consideration is the element of time saving, for in cultivating an orchard time is truly money, as well as in other lines of endeavor, especially when labor is as high as it is today. There is many a fruit grower making money and taking care of a large acreage almost entirely alone, except at fruit picking time, by using up-to-date machinery to the best advantage.

An ordinary tractor disk harrow makes an excellent tillage implement for orchard work, but there are many conditions where such a machine is not effective enough and a heavy duty implement is needed. There are now on the market some mighty fine tractor disk implements

finest disks obtainable should be used, preferably disks with forged edges because the forging toughens and refines the grain of the metal without making it brittle.

In New England there is fruit being grown under conditions which would discourage some of the middle-western fruit growers at the very start. Rocky hillsides which would be otherwise worthless are producing excellent fruit and at a handsome profit. The biggest problem in caring for such orchards is that of tillage and special disk tools are the solution of the problem.

One manufacturer of disk implements who has made a specialty of serving the needs of the fruit growers, makes a special offset machine, having a gang of large plowing disks which reaches five or



Delmar B. Smith, Southington, Conn., using heavy tractor disk machine in his extensive orchards, which has enabled him to do away with moldboard plows

for orchard work. Some of them were not originally designed for orchard tillage but fruit growers themselves have discovered their adaptability.

The disk implement illustrated has 24-inch disks and is made in sizes of five and one-half to eight feet wide. This implement is capable of chopping up the toughest old orchard sod and disking in rank growths of cover crops, not only many times faster than a moldboard plow but much better.

Many orchards are so full of stones that plow points break continually and spring-tooth harrows are ineffective. A good sturdy disk machine is the only thing that will handle such conditions satisfactorily, and on such work the very

six feet beyond the tractor. The disks are reversible so the soil may be thrown towards the trees or away from them. A similar tool has two gangs of disks, one throwing out and the other throwing in, like half of an ordinary tractor harrow. This implement also enables the fruit grower to cultivate under low hanging branches where he cannot drive his tractor. Both machines are excellent for all general work, and are capable of cutting the toughest sod. Both implements are equipped with the "cutaway" type of disk which digs into and chops up the tough sod. These implements are made in sizes suitable for both the tractor owner and the fruit grower who uses two or more horses.—E. R. Austin, Connecticut.

He Gets a Higher Price and Profit

(From Page Five)

said it would be better for all grades to be honestly graded and properly packed and that there is a market for all the apples of the better grades now grown, if packed in a manner acceptable to the consumer. The Marshall Farm produces from 30,000 to 40,000 bushels of apples annually. Those not packed in the above described containers are packed in standard wooden boxes. Mr. Marshall finds no difficulty in disposing of his entire crop at favorable prices, regardless of "surplus" years.

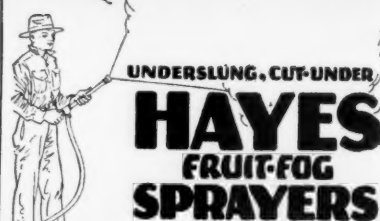
Varieties Packed in Corrugated Boxes

Baldwin, Wealthy, Gravenstein, McIntosh, and Delicious are packed in four sizes as follows: No. 4 containing 100 apples 2½ to 2¾ inches is labeled 2½ inches and sells for \$4. No. 3 containing 100 apples 2¾ to 3¼ inches is labeled 2¾ inches and sells for \$5. No. 2 containing 75 apples 3¼ to 3¾ inches is

labeled three inches and sells for \$6. No. 1 containing 75 apples 3¾ to 3¾ inches is labeled 3¾ inches and sells for \$7. These prices are all f. o. b. Fitchburg, Mass. Shipments are made by express.

Each variety sells at the same price. The difference in prices is controlled by the difference in the sizes of the apples.

From what we saw it is our opinion the purchasers are getting their money's worth in quality and quantity. The boxes holding 100 apples have their partitions arranged so that there are five rows of apples with five to the row, in four tiers. Boxes holding 75 apples have partitions with five rows of five to the row, in three tiers. These boxes are sealed with silicate of soda and with three-inch gummed paper tape. A printed label bearing the orchard's name and address, the name of the variety of apples and the quality, or grade, is pasted on one end of the box. The size and count, or number in the box, are stamped on with a rubber stamp.



Only the Hayes can make "Fruit-Fog"—the pest killing mist so fine it seeks out and soaks into every hiding place that breeds crop-robbing disease. Filters into every niche and crevice where air can go. Kills germs, disease, pests instantly. Sprays faster; needs less labor; thorough atomization (high pressure) cuts solution billows way down. Underslung cut-under truck makes hillside work safe. 50 models from hand to tractor types. Before you buy any sprayer, write for Hayes catalog. FREE. Address: **HAYES PUMP & PLANTER CO.** Dept. 909, Galva, Ill.



Bonus for Live Rats

25c plus your money back, if Tempto Rat Killer fails to get them all. Not a poison. Harmless to anything but Rats. Mice and Gophers. Pests die outside.

Send no money—just your name to Imperial Lab., 1273 Coca Cola Bldg., Kansas City, Mo., for a large \$2.00 Farm Size pkg.—enough for 200 Rats—for only one dollar, on 15-Days' Trial. If there is a live one left, the dollar you paid the postman (with postage), plus 25c for your trouble, will be cheerfully mailed you. So write today.

It's time to dust

and be sure you have a **PEERLESS DUST GUN** to apply it with.



It has stood the test and it is a pleasure to meet the owner of a Peerless. It is constructed of first class material by skillful workmen. Scientifically designed to produce a maximum of power with a minimum of effort. It brings results as low plants or medium sized trees are easily reached. Write for a circular and say where you saw this ad.

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SAVES SPRAY MATERIAL TIME AND MONEY

No. 145 ANGLE SPRAY ROD

Combines best features of spray gun and bamboo rod, enabling you to reach every part of a full grown tree with a fine mist spray, and at the same time gain speed and capacity of a large spray gun.

With the No. 145 Angle Rod you can reach the under side of trees, use a fog spray at short distances and even break up the spray at the long position.

Light—Easy to Handle

5½ feet long with a 40° angle at the nozzle end. Made of brass throughout. Weighs only 4½ pounds. Operator has positive control of spray mist. Saves as much as 25% in spray material—decreases labor—increases speed.

Satisfaction Guaranteed

Send now for complete literature, and names of users—or better still, enclose check or money order for \$11.00 (C. O. D. if preferred) and try this great spray rod on your own trees. If you do not think it is worth every cent of the price and more, return it and we will refund your money. Satisfaction guaranteed.

DEALERS: Write for special proposition.
MESSMER BRASS COMPANY
4700 So. 7th Street
St. Louis, Mo.

Established 1864

References: Lafayette South Side Bank or Dun's

A Successful Air Cooled Storage

(From Page Ten)

in the outer wall. The false floor is composed of two by four-inch strips laid one-half inch apart upon concrete floor joists or sills 16 inches high. These floor joists are three feet apart and run across the storage room from north to south. The cool air is taken in between these joists through openings along the north wall

operation of this storage, as the air movement is carefully controlled and the cold air is required to go where it is most needed instead of following the path of least resistance.

Humidity

Another feature of this storage is the system of maintaining the required humidity. As the ground floor is of concrete,

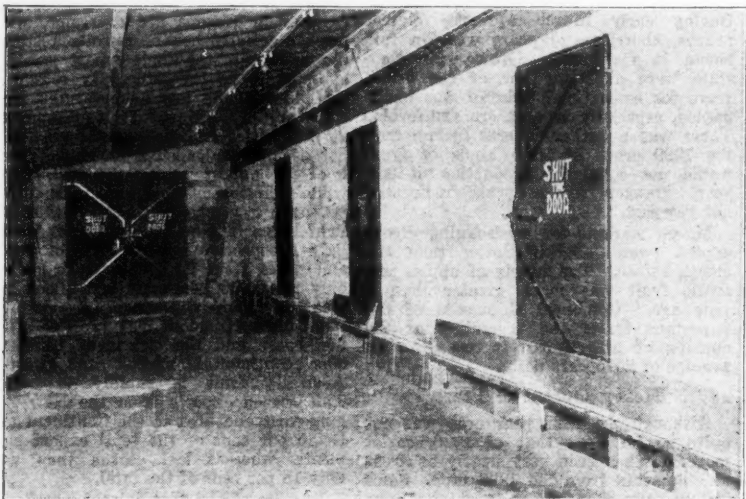


Fig. 3. Inside the driveway shed showing the doors to the storage proper with the cold air intakes below. The pipes carrying the small nozzles are visible just within the openings

into the driveway or vestibule (Figure 3). Hinged doors close these openings when not in use.

Ventilation

The warm air is exhausted from the room by means of four 26-inch motor-driven fans, equally spaced along the south wall just beneath the ceiling. The fans are of large capacity and move a great quantity of air in a short time.

Rigid ventilated crates are used for

artificial means of supplying moisture are necessary. This is accomplished by spraying water in a fine mist from a very small nozzle across each cool air intake opening while air is being taken in. The excess water collects upon the floor, where it is readily accessible to the air. The pipes carrying these nozzles are visible in Figure 3, just inside the cool air openings. The pressure for forcing the water through these nozzles is supplied by a small electric home water sys-

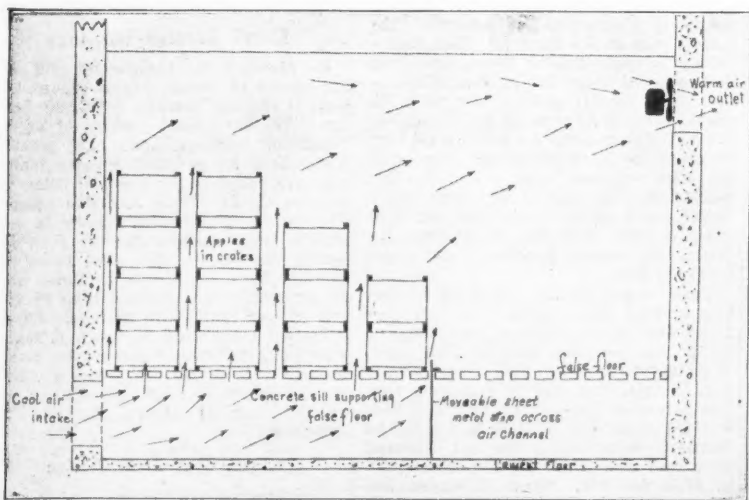


Fig. 4. Diagram illustrating how the air movement is controlled in order to force the air up about the fruit

holding the fruit. As the fruit is being stored, the space along the north side or front of the room is filled first, working from front to rear instead of filling the back part of the room first. Rectangular metal sheets that fit snugly across the space between the false floor sills are inserted through the cracks in the false floor immediately back of each stack of fruit in such a way that the air channel is closed at that point. This is done to force the cold air to come up about the stack of fruit instead of flowing along the ground floor until it is past the fruit and then rising to the fan by the most direct and least obstructed route. The manner in which this ventilating system operates is illustrated diagrammatically in Figure 4. This practice is perhaps the most essential factor in the successful


tem costing less than \$100. This system is automatic; when the water is turned on, the motor automatically starts to run, thus keeping a uniform pressure at all times.

The ceiling of the storage room is made of Celotex nailed to the bottom of 10-inch floor joists. The floor above the joists is of tongue and groove material one inch thick. No insulation is used between the joists, as an enclosed building above makes this practically unnecessary.

The cost of converting the basement of this building into a storage was approximately \$2000, the work being done by regular employees, supervised by hired carpenters. This building has given great satisfaction and has proved to be a good investment.

POWER!

POWER for any dry battery job—ringing bells, furnishing sure-fire ignition for trucks, tractors and stationary engines—any job about the farm. Eveready Dry Batteries are high-powered "handy men."

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YOU STILL HAVE TIME

But

You must act at once—if you want to grasp an outstanding publishing merger investment opportunity

This will probably be the final announcement to appear in the AMERICAN FRUIT GROWER MAGAZINE in connection with one of the most important consolidations of leading business and trade journals which has taken place during the past few months, under the direction of the

AMERICAN BUSINESS JOURNALS, Inc.

In the advertising columns of previous issues of this publication you were informed that the AMERICAN FRUIT GROWER MAGAZINE was to be included as one of the important units of a merger embracing a substantial number of important magazines.

Now you will be no doubt interested to learn that your magazine has been consolidated with seven other representative periodicals, named below, to form the nucleus of an aggregation of trade, technical and class journals.

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to participate in the future profit possibilities arising out of benefits which should accrue through this important merger in the publishing industry will be offered to subscribers to your publication and the other magazines involved in the consolidation, including the following:

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The Market Review

By PAUL FROEHLICH
United States Bureau of Agricultural Economics

WITH THE OPENING of spring, 1929 fruit prospects were becoming more definite. The severe February freeze in the Pacific Northwest probably caused some damage to orchards in that region. During early March apricots, plums, prunes, cherries and pears were in full bloom in California. Growers in that state were expecting one of the driest years for some time; rainfall was badly needed, especially in northern California. There was a rather general feeling that the 1929 crops of some kinds of fruit would not equal the production of last year. Danger from a spring freeze was not yet past.

March markets for most fruits, except apples, were slightly lower than the month before. The supply of apples and citrus fruit was much greater than a year ago. Combined shipments of the important fruits and vegetables at the opening of March had increased to an average of 2575 cars daily.

Heavy Output of Pears

Although the 1928 pear crop was not quite so large as that of 1926, carlot movement has been very nearly as great as shipments from the 1926 crop. Some 25,200 cars of pears were shipped two seasons ago, whereas movement for the season now ending has exceeded 24,300 cars, and small quantities are still moving out of storage. From the short crop of 1927, only 18,750 cars were marketed. California has shipped fully 11,000 carloads from last year's production, some of these, of course, going to canneries. Washington's output has exceeded 5800 and Oregon's 4400 cars. The only other state shipping more than a thousand carloads of pears is New York, with a total of about 1575. As a general rule, carlot movement of this fruit accounts for about half the total crop, while local consumption, waste, canning and other processing accounts for the other half.

A co-operative organization of fruit growers at one of the leading shipping points in California has reported "the largest year in its history." This organization packed 398,000 boxes and 1030 half-boxes of pears during the 1928 season. The regular packing charge is 55 cents. Of this amount, 26 cents goes for the material required for a 50-pound box, 16 cents for labor costs, and four cents for office expense, light, power and depreciation. The sum of five cents is deducted for a withholdings fund, and four cents is being refunded to growers, reducing the actual packing costs to 46 cents per box.

Texas is not usually considered an important pear state, and yet the estimated farm value of its 1928 crop was \$488,000, which was exceeded only by California, Washington, Oregon, New York, Michigan, Pennsylvania and New Jersey. One association of growers at Ysleta, Texas, handled more than 106,000 field boxes of Bartlett pears during its last business year, and this fruit sold for an average of \$1.50 per box. Trade expansion has been rapid during the past five years of this organization's history.

Apples Selling Higher

Movement of apples from the state of Washington became extremely active during late February and early March and was at that time exceeding 200 cars a day. Holdings in the Pacific Northwest have been heavy this winter. As the season rapidly approaches an end, it is necessary to get this fruit into consumptive channels. The Potomac Valley season is about finished, and western New York was hardly expected to ship by rail more than 4500 carloads of apples after March 1. Holders of Baldwins were optimistic as to the spring market. They were asking \$2 per bushel for U. S. No. 1, 2½ inches up, Baldwins. The f. o. b. price of best barreled stock was \$5.50-\$6.

The Pacific Northwest quoted Extra Fancy, medium to large Winesaps at \$1.75-\$1.90 per box, while Delicious approached \$2.75-\$3. City prices on nearly

all apples were firm to slightly higher. Demand has been rather moderate, and no sensational developments are expected during the remainder of the season.

Once the effects of the extremely cold weather in Europe are overcome, when market activity has been fully restored, the wind-up of the apple export season is expected to be favorable. By reason of the exceptionally low temperatures, especially on the Continent, fruit accumulated at port cities and, in some cases, could not even be unloaded from ships. Trading was almost at a standstill, for a while. However, American apples should yet have a good chance, in view of the light crops in New Zealand and Australia. Prospective total exports of apples and pears from that general region are only 2,700,000 boxes, or just about half what they were a year ago. Of that total, the United Kingdom may receive 1,530,000 boxes and the Continent 1,052,000. The continental market for western Australia fruit is rapidly expanding. This season exports from the New Zealand-Australia area to the Continent may be 35 per cent of the total export shipments, whereas last season they were only 18 per cent of the total.

In spite of the accumulated supplies in continental ports, the Hamburg auction showed strength about March 1. Best barreled apples from Virginia and New York were ranging \$7.40-\$10, and Washington boxes sold at \$2.75-\$4.50. These prices are considerably higher than those reported on the Liverpool auction at the same time, but improvement was expected in British markets as soon as more favorable weather prevails. Total exports of United States and Canadian apples to March 2 were 3,281,334 barrels and 9,723,853 boxes, compared with 1,900,117 and 4,734,138 respectively by the same time last season. Three new export markets were added to the list of foreign countries receiving apples from the Yakima Valley of Washington, namely, China, Mexico and the Philippines.

March Storage Holdings

On March 1, the commercial cold storage plants in United States reported on hand 1,125,000 barrels, 7,973,000 boxes and 2,175,000 bushel baskets of apples. Combined holdings under refrigeration were about 22 per cent heavier than a year ago but were five per cent below the average stocks of the last five seasons. The supply of barreled apples in cold storage was one-third greater than last spring but was 43 per cent below the average figure for March 1. Boxes were 13 per cent more plentiful than in 1928 and 10 per cent above average. Of the 8,000,000 boxes still on hand, 5,000,000 were held in Pacific Coast states. Bushel baskets were 42 per cent above the holdings of March 1, 1928, and 92 per cent greater than the average for the last five years.

Citrus Movement Active

Considerable trouble was being experienced in California and Florida from the dropping of citrus fruit. Windstorms added to the frost damage in California. Florida fruit was being rushed to market at the rate of 175 cars of oranges, 110 cars of grapefruit and 50 cars of mixed citrus each day. California was shipping 200 cars of oranges daily during early March. Total grapefruit shipments were 3845 cars in excess or 34 per cent ahead of last season's corresponding record. Oranges showed an excess of 11,550 cars or 37 per cent over the 1928 total to March 10, and movement of mixed citrus fruit was running 1400 cars or 24 per cent ahead of last year's total to the same date. Lemons, with an excess of 1660 cars, have registered the greatest percentage increase, or 70 per cent over last season's early record.

Citrus fruit consumption probably has been increased this season as a result of advertising campaigns in connection with epidemics of influenza. This sickness has

Index to Advertisements

The concerns whose advertisements appear listed below are equipped to give prompt and satisfactory service to the American fruit grower. Most of them issue literature that is freely at the disposal of our subscribers. It is to the advantage of all that when writing to an advertiser you use the address exactly as it appears in the advertisement, and that you state in your letter: "I read Your Advertisement in AMERICAN FRUIT GROWER MAGAZINE."

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prevailed in Great Britain and on the Continent, as well as in America. In some of the foreign markets, demand for citrus has been greater than that for apples. Good Florida grapefruit was selling on the Liverpool, England, auction at \$1.15-\$5.10 per box, and California oranges at \$6.60. The British orange market was strengthened by smaller supplies than usual from Spain and Jaffa.

Many Florida Strawberries

Florida has had a very active berry season. During the latter part of February, average daily shipments were about 50 cars, but by the first week of March, the average decreased to 35 cars a day. In addition to the earliest less-than-carload movement, about 1200 straight cars had been forwarded by March 10, compared with 200 during the same period last year. These strawberries were jobbing in city markets on a quart basis at 25 to 45 cents. The Plant City district of Florida has had a prosperous season, and now movement is getting under way in Louisiana and Texas.

New Jersey Growers Win Judgment

A SUIT that is said to establish a precedent in cold storage claims was won by fruit growers in the Gloucester county (New Jersey) circuit court on February 8. The action was against a New Jersey cold storage company and involved close to \$100,000 in claims of 12 fruit growers who had 100,000 baskets of peaches spoil in storage during a period of glut.

The first suit was in the nature of a test case. It was brought by Edward E. Miller, a fruit grower, for the loss of 16,225 baskets of peaches. A jury of nine men and three women awarded him a verdict of \$7,973.57, while the storage company was given an award of \$750 for storage charges.

Many fruit growers and cold storage men attended the trial, which lasted nearly four days. It was testified that during a period of glut in the market in the late summer of 1927 the growers prevailed upon the storage company to open its large cold storage plant in order that the peaches might be held for a higher market. Virtually all of the fruit spoiled, the growers claim.

The basis of the suit was that the cold storage company was negligent in not maintaining a proper temperature for the preservation of the fruit. For the defense, a form of contract was presented which all the growers had signed. In it the company set forth that it would not be responsible for any loss of perishable products nor for maintaining any certain temperature in its plant.

The court instructed the jury to determine if there had been any proof presented of negligence in carrying out the contract. The storage company is expected to appeal to the higher courts.—*J. G. Sholl, New Jersey.*

Use Care with Blasting Caps

FARMERS, fruit growers, and all others who use blasting caps in connection with explosives, are asked to take special care to see that no blasting caps are left about where children can find them. During the past year approximately 500 children were maimed or crippled as a result of explosions of blasting caps which they picked up where they had been left by careless workmen. In some cases children were killed.

Statistics gathered on accidents of this nature show that about 80 per cent of them occur in rural or semi-rural districts. Blasting caps seem to have a fascination for boys, who try to explode them by hammering, picking, or throwing them into bonfires. Numbers of cases at law have resulted from the injuries sustained by boys. Parents have sued and obtained damages against companies and individuals who have been responsible for leaving blasting caps carelessly about. But above all, this carelessness takes a serious toll of the children of the country, because it results in loss of eyes, hands, limbs and other injuries which unfit them for useful occupations in later life.

When fruits are eaten raw none of the vitamin content is lost.

The FRUIT FARM MARKET

ADVERTISING RATES, 15 CENTS A WORD

Write advertisement on separate sheet. Please enclose cash with order. For advertisements addressed in care of this publication, allow 5 words for address.

SPECIAL NOTICE

All advertising copy, discontinuance orders or change of copy must reach this office by the 10th of this month for next issue.

AMERICAN FRUIT GROWER MAGAZINE
53 West Jackson Boulevard, Chicago

AGENTS-SALESMEN WANTED

BIG PAY EVERY DAY TAKING ORDERS FOR dress shirts, work shirts, pants, overalls, sweaters, underwear, hosiery, pajamas, playsuits. Experience unnecessary. Outfit free. Nimrod Co., Dept. 102, 4922-28 Lincoln Ave., Chicago.

\$12.00 DAILY SHOWING NEW LINEN-LIKE tablecloth. Washes like oilcloth. No laundering. Sample free. Bestever, 666 Irving Park Station, Chicago.

WE PAY \$45 A WEEK AND EXPENSES AND give Ford auto to men to introduce poultry and stock compounds. Imperial Co., D-20, Parsons, Kansas.

MAKE \$10 EVERY DAY INTRODUCING NEW automatic window washer. Amazing invention. Send for free sample offer. National Industries, 67 E. Lake, Dept. 194, Chicago.

\$50.00 WEEKLY. MEN WANTED TO DEMONSTRATE and take ten orders daily direct from motorists. Amazing magnetic trouble light. Sticks anywhere! More orders, bigger pay. Write for demonstrator and particulars. Magno, Beacon Bldg., Dept. 144, Boston, Mass.

BEES

BEES NEEDED IN YOUR ORCHARD—IF YOU want the largest and best quality fruit, you must have bees to pollinate the blossoms. Bees often more than double the crop. They are easy to keep and yield a good profit in honey alone. Let us tell you how to start right. Ask for our free booklet, "Bees and Fruit." The A. I. Root Company, 512 Liberty St., Medina, Ohio. (Oldest and largest bee-supply house in America.)

DUSTERS—FOR SALE

TWO NIAGARA DUSTERS FOR SALE—ALMOST good as new. Bargains. Cory Orchards, Cory, Ind.

FARMS AND ORCHARDS

"BOOK OF 1000 BARGAINS." STROUT'S CATALOG of Farms, just out! 134 big pages, alive with interesting news, pictures and property descriptions throughout 21 states. Farms making money, assuring a wholesome, independent living. Lovely country homes, or business chances, at prices astonishingly low. Save weeks of looking, and months of your savings. Write today for this free catalog to Strout Agency, 255 AY-Fourth Ave., N. Y. City.

FOR SALE—175-ACRE FRUIT FARM IN OHIO'S famous "Island District." 18,000 bearing trees. 6000 grapes, 5200 2-4 year trees. Some farm land and hunting marsh. Excellent roads and marketing facilities. Good schools, churches and summer vacation facilities. Address V. H. Davis, Port Clinton, Ohio.

FOR SALE—SEVENTY-SEVEN ACRE FRUIT farm near Johnston City, Ill.; twenty-five hundred bearing peach trees; also vineyard; part of bankrupt estate; bargain. Address A. L. Fowler, trustee, Marion, Ill.

40 ACRE FRUIT FARM 2 MILES FROM Dowagiac, Mich. Near resort lakes. 2300 young trees, bearing. Priced right for quick sale account ill health. William Weinberg, 3538 Beach Ave., Chicago.

FARMS WANTED

CASH FOR YOUR PROPERTY, FARM, BUSINESS or residence. No matter where located. Free information. International Realty Co., Ford Bldg., Detroit.

WANT TO HEAR FROM OWNER HAVING farm for sale; give particulars and lowest price. John J. Black, Box 68, Chippewa Falls, Wis.

WANTED—TO HEAR FROM OWNER OF LAND for sale for spring delivery. O. Hawley, Baldwin, Wis.

FUR RABBITS

MAKE BIG MONEY WITH CHINCHILLA Rabbits. Real Money Makers. Write for facts. 846 Conrad's Ranch, Denver, Colorado.

NURSERY STOCK

YOUNGBERRIES AND HOW TO GROW THEM. free. \$5000 from 4 1/2 acres 1 year old. Plants from us of this marvelous new type berry now growing in 20 states. Acme Berry Gardens, Chino, Calif.

APPLE AND PEACH TREES, 50 AND UP; grape vines, 3c; best varieties. Catalog free of fruits, berries and ornamentals. Benton County Nursery, Box 500, Rogers, Ark.

DANIEL'S RED DUCHESSE—THE MOST PROFITABLE early red apple. Catalog free. Daniel's Nursery Co., Long Lake, Minn.

PEACH TREES 40, APPLE 60 IN HUNDRED lots. Cherry, pear, plum, shrubs. Catalog free. Leo H. Graves, Farina, Ill.

NUTS

BUDDED NUT TREES, HARDY NORTHERN varieties, early and prolific bearers of large, thin shelled nuts. Catalog free. Indiana Nut Nursery, Route B, Rockport, Ind.

PLANTS

EARLY VEGETABLE PLANTS—FROSTPROOF cabbage: Wakefields, Copenhagen, Golden Acre, Flat Dutch, Bermuda onions, beets, lettuce. Postpaid: 100, 40c; 500, \$1.25; 1000, \$2.25. Collect: 1000, \$1.00; 5000, \$4.50. Tomato plants: Earliana, Bonny Best, Baltimore. Postpaid: 100, 50c; 500, \$1.50; 1000, \$2.50. Collect: 1000, \$1.75; 5000, \$7.50. Write for prices on potato, pepper and egg plants. Carefully packed, varieties labeled, delivery guaranteed. Piedmont Plant Co., Albany, Ga.

ELDORADO BLACKBERRY PLANTS, ONLY \$2 hundred, \$15 thousand. Strong, healthy, state inspected. Order today from this ad. Charles Rickart, Box No. 32, Rosedale, Kansas.

NEW SOIL SMALL FRUIT PLANTS, STRAWberries, (Mastodons), blackberries, raspberries, shade trees, shrubbery, bulbs. Reasonable prices. Cloverleaf Nursery, Three Oaks, Mich.

100 GENUINE MASTODON, \$1.85; 250, \$3.75. Catalog free. Edward Laube, New Buffalo, Mich.

PAY THE POSTMAN. SEND NO MONEY. Frostproof cabbage and onion plants. Leading varieties. 500, 65c; 1000, \$1.00. Albany Plant Co., Albany, Ga.

BERMUDA ONION PLANTS—GROW BIGGER and better onions. Frostproof. Postpaid: 250, 55c; 500, \$1.00; 1000, \$1.75. Port Melling, North Lima, Ohio.

S. C. BUFF LEGHORNS

BUFF LEGHORNS, CHICKS, PULLETS, HATCHING eggs, hens, males, big breeders, quality stock. Catalog. Hazzard (Strain) Farms, Route 5-C, Greenfield, Ind.

SEEDS

FIELD AND GARDEN SEEDS, ONION PLANTS, oil emulsion for dormant spray. McCarty Seed Company.

ASPARAGUS SEED (WASHINGTON RUST-proof), \$1.50 lb., 10 lbs. or more, \$1.25. Harold Black, Adrian, Mich.

SONG POEM WRITERS

SONG POEM WRITERS. "REAL" PROPOSITION. Hibbeler, D-96, 2104 N. Keystone, Chicago.

TOBACCO

LEAF TOBACCO—GOOD SWEET CHEWING. 3 lbs., 90c; 5, \$1.25; 10, \$2.00. Smoking, 3 lbs., 60c; 5, 90c; 10, \$1.50. United Farmers, Mayfield, Kentucky.

"Brooks' Fruit Spot" Cost \$1,000,000

(From Page Six)

of July. The incubation period is long, consequently it will be useless to spray after the first appearance of the disease. The spray must accompany the infection period. We know, too, that the fungus enters the apple through the lenticel, the small breathing pore. The fungus does not go deep. Later in the season these pores close somewhat.

There are two ways in which fungicides might be effective. If the application is made during the period in which the fungus is infecting, we can expect to kill it before it gets into the apple. But if we miss this period, the only thing that can do any good is a penetrating fungicide. We find, too, at the outset, that both sulphurs and coppers will kill the fungus, but we also know that sulphurs often fail. They sometimes control absolutely, as did our sulphur and dry lime-sulphur dusts last year in southern Ohio, as reported in the February AMERICAN FRUIT GROWER MAGAZINE.

The explanation for such contradiction seems to be this: If sulphurs are timed properly, that is, applied during the in-

fection period, they will control, and since they cannot be expected to penetrate to any extent, control cannot be expected if they are applied after the fungus has penetrated the apple.

On the other hand, copper not only controls at the initial infection, but may be expected to penetrate the lenticel, especially before it is entirely closed. Copper sprays are therefore usually effective. Regardless of the fact that many sulphur tests have been successful, that material is not and cannot be as reliable as copper. Our experience has shown that a two to three-week spray with a 2-4-50 Bordeaux is the best bet. Possibly, this will be slightly altered when results are obtained from our elaborate program which is to be carried out in southern Ohio this year if we have "Brooks' Spot."

Laid Up

"You don't look well."
"No, I have just been unconscious for eight hours."
"Heavens! What was wrong?"
"Nothing—I was just asleep."

WHAT THE CAMERA SEES

AMERICAN FRUIT GROWER MAGAZINE will pay Five Dollars for the photo selected each month as the PRIZE PHOTO, and will pay One Dollar each for other photos not receiving the prize money but which we are able to use. Send your photo, illustrating anything of interest to the fruit grower, with a short item telling the FACTS about the picture. Address photos to the Editor. If not suitable for our use, your photo will be returned.



This shredding machine, hooked to a tractor, disposes of grape prunings in short order in Fresno county, California. The brush is chopped up fine and buried under the soil, which receives a thorough working in the operation.



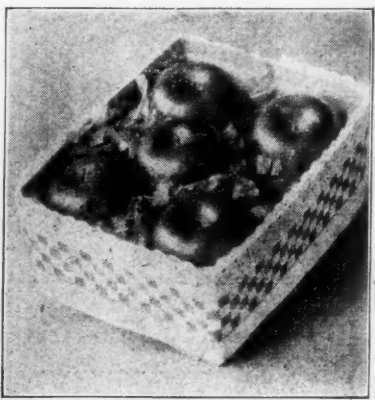
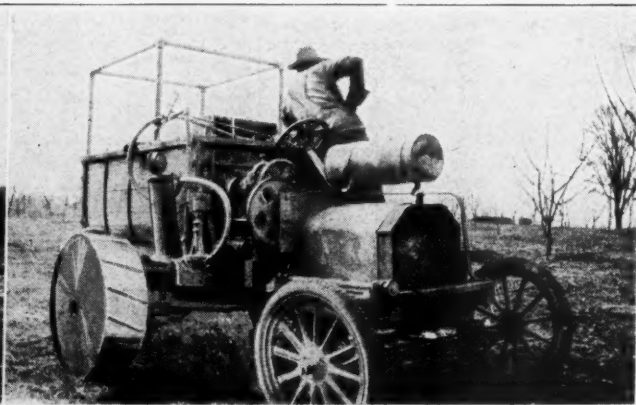
In the Barnes Brothers Orchards, Connecticut, a special tractor orchard disk plow works close to the trees where ordinary implements will not reach. The soil in this old peach orchard is very heavy clay loam with many stones.



Calvin Mauzey, aged 18 months, appears entirely satisfied with the prospects for a good crop from this Golden Delicious tree on his father's Kansas farm.



What happened to Lizzie? According to A. F. Vierheller, Maryland Horticulturist, who describes this outfit in an article in this issue, only a radio is lacking to make it complete. If the operator, Lloyd Balderston, starts downhill with the outfit, he'll either have to sit down or get another foot somewhere with which to operate the brake. (PRIZE PHOTO)



These five McIntosh apples were grown on a tree in its 60th year, and exhibited at the College Fruit Show at the University of Vermont. Photo sent by Prof. M. B. Cummings.



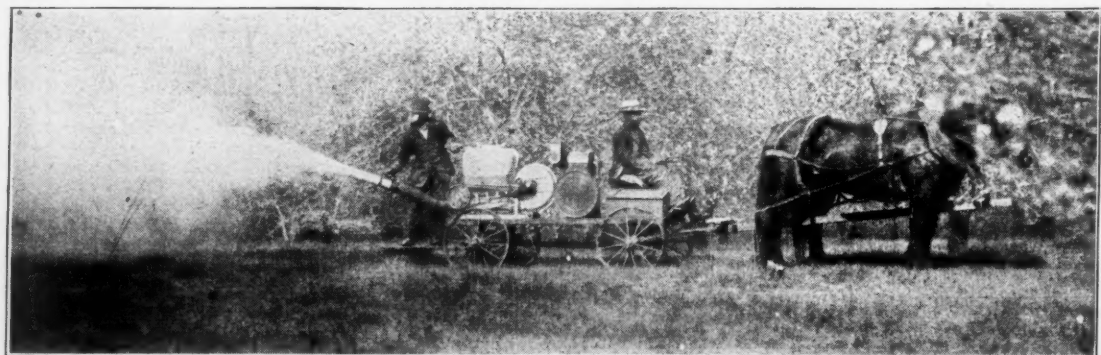
Ralph Sundquist, Washington, believes it's easier to pull pipe for a stationary spray plant through the ground with a subsoller and tractor than to dig a ditch. See article in this issue. (PRIZE PHOTO)



Walter and Harland Button picking the first crop from their father's three-year-old peach orchard, Kentucky. The trees averaged two bushels per tree and sold at \$1.50 per bushel in the orchard.



Three grape growers estimate the weight of grapes on this Concord vine grown by Christ Stuck, Iowa, at 25 to 30 pounds. If the vines were planted 10 by 10 feet this would figure out to 5½ to 6½ tons to the acre, an entirely possible yield. And a profitable yield.



W. N. Scarff, Ohio, finds that dusting as a supplement to spraying has given very satisfactory control in this 20-year-old apple orchard, and has resulted in clean foliage and fruit.

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